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Guidance for the Reregistration of Pesticide Products Containing Lindane as the Active Ingredient

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GUIDANCE FOR THE REREGISTRATION OF PESTICIDE PRODUCTS CONTAINING AS THE ACTIVE INGREDIENT

LINDANE
(009001)

CASE NUMBER 315

CAS 58-89-9

ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF PESTICIDE PROGRAMS

WASHINGTON, D. C. 20460

September 1985

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I. INTRODUCTION

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA sec. 3(g)) directs EPA to reregister all pesticides as expeditiously as possible.

To carry out this task, EPA has established the Registration Standards program, which will review all pesticide products containing active ingredients first registered before January 1, 1977. Pesticides generally will be reviewed in use clusters which have been ranked to give earliest review to pesticides used on food and feed crops.

The Registration Standards program involves a thorough review of the scientific data base underlying pesticide registrations and an identification of essential but missing studies which may not have been required when the product was initially registered or studies that are now considered insufficient. EPA's reassessment results in the development of a regulatory position, contained in a Registration Standard, on each pesticide and its uses. The Agency may require the registrant to provide additional data to support existing registrations, modify product labels to provide additional precautionary statements, restrict the use of the pesticide to certified applicators, provide reentry intervals, modify uses or formulation types, specify certain packaging limitations, or other requirements to assure that proper use of the pesticide will not result in adverse effects on the environment. The Registration Standard may lead to initiation of a Special Review if it appears that use of the product may cause unreasonalble adverse effects on the environment. The Special Review can result in a decision by the Agency to seek a change in the conditions of registration, suspension, or cancellation of the registration.

The scientific review, which is not contained in this Guidance Document but is available upon request, focuses on the technical grade of the active ingredient and identities missing generic data. However, during the review of these data we are also looking for potential hazards that may be associated with the end-use (formulated) products that contain the active ingredient. If we have serious concerns, we will address end-use products as part of the Registration Standards program and will propose regulatory actions to the extent necessary to protect the public.

EPA has the authority under FIFRA sec. 3(c)(2)(B) to require registrants to submit data regarding the hazards which may result from the intended use of a pesticide. Although sec. 3(c)(2)(B) provides that all registrants are responsible for these data, the Agency generally imposes generic data requirements only on the registrants of the manufacturing-use products (basic suppliers of the active ingredient) and other producers who do not qualify for the formulator's exemption.*

A producer who does not currently qualify, but wishes to qualify for the formulator's exemption, may change his source of supply to a registered source, provided the source does not share ownership in common with the registrant's firm. A registrant may do so by submitting a new Confidential Statement of Formula (EPA Form 8570-4), identifying the registered source of the active ingredient, to the appropriate Product Manager within 90 days of receipt of this Guidance Document. The chart on the following page shows what is generally required of those who do and who do not qualify for the formulator's exemption in the Registration Standards program.

If you decide to request the Agency to cancel the registration of any of your products subject to the requirements of this Guidance Document, please notify the Product Manager named in the cover letter, within 90 days from the receipt of this document. If you decide to maintain your product registration(s), you must provide the information described in the following pages within the time frames outlined. EPA may issue a notice of intent to cancel or suspend the registration of any currently registered product which does not comply with the requirements set forth in this Guidance Document.

You are reminded that FIFRA sec. 6(a)(2) requires you to submit factual information raising concerns of possible unreasonable adverse effects of a pesticide. You should notify the Agency of interim results of studies in progress if those results show possible adverse effects.

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*The formulator's exemption applies to a registrant of an product if the source of his active ingredient(s): (1) is a registered product and (2) is purchased from a source which does not have ownership in common with the registrant's firm.

PRODUCTS SUBJECT TO THE REGISTRATION STANDARDS PROGRAM	ACTION(S) REQUIRED TO MAINTAIN REGISTRATION
I. Products That Do Not Qualify For The Formulator's Exemption	
A. Single Active Ingredient Products*	These products must be reregistered. To obtain reregistration, labeling, packaging, and data requirements must be satisfied in accordance with the Registration Standard's Guidance Document.
B. Multiple Active Ingredient Products	These products will not be reregistered at this time. However, generic data required to continue the registration of the active ingredient under review, as described in the Registration Standard's Guidance Document, will be required and some labeling precautions may also be required.
II. Products That Do Qualify For The Formulator's Exemption	Only when additional restrictions or labeling are needed to protect man or the environment will these products be subject to the Registration Standard requirements. Affected products will be dealt with in a variety of ways, including but not limited to the Label Improvement Program and special intent to cancel notices.

* End-use products of registrants who also produce a manufacturing-use product will not be required to be reregistered provided that registrant fulfills the requirements specified in the Guidance Document for manufacturing-use product(s). Such end-use products will be subject to the labeling changes required for products in "II" above. If there are no manufacturing-use products registered by any company, end-use products will be required to be reregistered.

NOTE: If all registrants in "I" above fail to meet the requirements in "I-A" and "I-B" above, then the registrants in "II" lose their right to qualify for the formulator's exemption and become subject to the requirements in "I-A" and "I-B".

II. REGULATORY ASSESSMENT

A. INTRODUCTION

This chapter contains the Agency's regulatory position on products containing the pesticide lindane as the sole active ingredient. The Agency bases its position and rationale on a consideration of all uses of lindane appearing on pesticide products registered under Sections 3 and 24(c) of FIFRA as well as on products authorized for distribution in intrastate commerce under 40 CFR 162.17. The Agency has reviewed the known chemical, environmental, and toxicological characteristics of this pesticide and its established tolerances for residues in or on food or feed commodities. From these considerations, the Agency sets forth the data and labeling requirements that must be met by registrants and applicants for registration of lindane products in order for their products to be registered or reregistered under this Standard. Unique labeling requirements and certain data needs for end-use products (EPs) that contain lindane are also established by this Standard.

Only those data and labeling requirements for current and future substantially similar MPs and EPs are addressed here. Future products that differ appreciably from those described in this Standard may be subject to additional data and/or labeling requirements.

B. Chemical Description and Use Profile

Lindane is the common name accepted by the International Organization for Standardization for the insecticide consisting of $\geq$ 99% of the gamma isomer of 1,2,3,4,5,6-hexachlorocyclohexane. In Great Britain the compound is known as Gamma HCH or Gamma BHC. The Chemical Abstract name is 1α, 2α, 3β, 4α, 5α, 6β-hexachlorocyclohexane. Lindane is marketed under the trade names Exagamma, Forlin, Gallogamma, Gammaphex, Gammex, Gexane, Grammapoz, Grammexane, Inexit, Kwell, Lindafor, Lindagrain, Lindagram, Lindagranox, Lindalo, Lindamul, Lindapoudre, Lindaterra, Lindex, Lindust, Lintox, Novigram, and Silvanol. The Empirical Formula is $C_6H_5Cl_6$ and the molecular weight is 290.0. The Chemical Abstracts Service (CAS) Registry Number is 58-89-9 and the EPA Chemical Code Number is 009001.

Technical lindane is not manufactured in the United States. All of the technical lindane used in this country is imported from France, Germany, Spain, Japan, and China.

Benzene hexachloride (BHC) contains a mixture of alpha, beta, and gamma isomers. Lindane is the gamma isomer of BHC. BHC was once used as an insecticide and earlier data were generated using the mixture of the isomers. Shortly after the initiation of the Agency's Rebuttable Presumption Against Registration (RPAR) review of lindane in 1977, EPA required registrants of BHC to reformulate their technical products to exclude the alpha and beta isomers of BHC, which had been found to be generally more toxic than the gamma isomer. Lindane should not be confused with hexachlorobenzene, which is a fungicide with its own pesticidal uses and data base.

Technical lindane is a white crystalline solid with a melting point of 112°C. It is stable to light, heat, air and strong acids but decomposes to trichlorobenzenes and HCl in alkali. It is soluble in most organic solvents and is soluble in water at 10 parts per million (ppm) at 20°C. Other chemical and physical properties include vapor pressure of 9.4×10^{-6} mm Hg at 20°C, and specific gravity 1.85. Existing data gaps relating to product chemistry are identified in Table A and Table B.

There are 25 manufacturing-use products, 183 Federally registered FIFRA Section 3 end-use products and 81 FIFRA Section 24(c) Special Local Need registrations containing lindane as the sole active ingredient. Products containing lindane in combination with another active ingredient (other than solvents) include 94 Federally registered FIFRA Section 3 end-use products and 5 FIFRA Section 24(c) Special Local Need registrations. All intrastate products were removed from commerce effective October 1, 1984 by the Notice of Intent to Cancel Pesticide Products Containing Lindane (48 FR 48512, October 19, 1983).

Lindane is formulated into emulsifiable concentrates, flowable concentrates, soluble concentrate/liquids, wettable powders, dusts, wettable powder/dusts, ready-to-use liquids, pressurized liquids, and impregnated materials.

Lindane is an insecticide/acaracide registered for use on a variety of fruit and vegetable crops (including seed treatment), ornamentals, tobacco, greenhouse vegetables and ornamentals, forestry (including Christmas tree plantations), domestic outdoor and indoor uses by homeowners (including dog dips, household sprays and shelf paper), commercial food or feed storage areas and containers, farm animal premises, wood or wooden structure sites, and human skin/clothing (military use only).

Aerial application of lindane is prohibited. Lindane may be applied as a dip tank solution (livestock, lumber, and pets), as a livestock spray, by ground equipment delivering a ground or foliar spray or dust, by soil incorporation, by soil injection in combination with a fumigant (for the pineapple use only), as a smoke (for greenhouse fumigation only), and as a dust to human skin/clothing (military use only).

C. REGULATORY POSITION AND RATIONALE

The regulatory history of lindane includes a full EPA Rebuttable Presumption Against Registration (RPAR) review based on questions of oncogenicity, fetotoxicity/teratogenicity, reproductive effects, its potential to cause blood dyscrasias, and acute toxicity to aquatic wildlife. Position Documents were published in 1977 (PD-1), in 1980 (PD-2/3) and in 1983 (PD-4). A Notice of Intent to Cancel Pesticide Products Containing Lindane was issued October 19, 1983 (48 FR 48512, October 19, 1983). The triggers for fetotoxicity/teratogenicity and reproductive effects were successfully rebutted. Its potential to cause blood dyscrasias could not be confirmed with the data on hand. The trigger for acute toxicity to aquatic wildlife was withdrawn because lindane is no longer registered for uses involving direct aquatic application.

The oncogenic effect was not rebutted. As a result of a risk/benefit analysis based on the oncogenic risks, the RPAR decision resulted in the phasing out of registrations for lindane smoke fumigation devices for indoor domestic use (with cancellation becoming effective May, 1986) and in the cancellation of lindane dog dips for the control of pests other than mites. The dog dip cancellation was challenged, and subsequently the dog dip use for pests other than mites was permitted for veterinary use provided additional precautions to limit applicator exposure appeared on the labeling. The Notice of Intent to Cancel Pesticide Products Containing Lindane (48 FR 48512, October 19, 1983) also restricted certain uses of lindane to Certified Applicators or persons under their direct supervision. The restricted uses include avocados, pecans, livestock sprays, forestry, Christmas trees, commercial ornamentals, structural treatment, dog shampoos, and dog dusts. The Notice of Intent to Cancel also required the use of protective clothing for applicators using lindane products for seed treatment by manual means, livestock sprays, avocados, pecans, forestry, Christmas trees, hardwood lumber, ornamentals, crawl space treatments, dog dips, and dog shampoos.

This Registration Standard reflects a reassessment of the data base used in the RPAR review for lindane, as well as all other data available to the Agency, and specifies additional studies which have been determined, based on this review, to be required to support the registration(s) of lindane. The PD-4 provides further discussion of many of these issues.

Based on a comprehensive review and evaluation of all available data and other relevant information on lindane, the Agency has determined the following:

1. Manufacturing-use pesticide products that contain lindane as a sole active ingredient may be registered for sale, distribution, reformulation, and use, subject to the terms and conditions specified in this Standard and current label requirements. Registrants must provide or agree to develop additional data, as specified in Tables A and B, in order to maintain existing registrations or to permit new lindane registrations.

Rationale: Except for the forestry and uninhabited buildings and empty storage bins spray uses, as described elsewhere in this chapter, the Agency has concluded based on available data that, for all other currently registered uses, the benefits of lindane exceed the risks, so long as the precautions required by this Standard are adhered to. Even though the review indicates that certain studies are needed by the Agency, under FIFRA the Agency may choose not to cancel or withhold registration if data are missing or are inadequate (see Sections 3(c)(2)(B) and 3(c)(7) of FIFRA). Rather, issuance of this Standard provides a mechanism for identifying additional data needs. These data will be reviewed and evaluated, and the Agency will determine at that time whether they will affect the risk/benefit determinations described in this assessment.

2. The No Observed Effect Level (NOEL), the highest dose of a test substance that can be administered without eliciting any signs or other toxic reactions in test animals, has been lowered for systemic effects of lindane since the issuance of PD-4 based upon recent Agency acceptance of a subchronic feeding study in rats. Until the results of an acceptable chronic feeding study are submitted and evaluated, the Agency will use the subchronic study to establish a Provisional Acceptable Daily Intake (PADI), which represents the Agency's determination of an acceptable level of dietary exposure to residues of a pesticide per kilogram of body weight. The Agency is requiring the submission of a chronic feeding study in rats so that an Acceptable Daily Intake (ADI) can be determined.

Rationale: The available rat chronic studies do not meet current Agency Guideline criteria (Pesticide Assessment Guidelines, Subdivision F, Hazard Evaluation: Human and Domestic

Animals; November 1982). Therefore, the Agency is requiring the submission of an adequate rat chronic feeding study so that an ADI can be determined based upon the experimentally determined NOEL. The ADI (which traditionally is based upon an adequate chronic toxicity study) or PADI, which is an interim level based upon the NOEL from any other valid toxicity study) is calculated by dividing the NOEL by an appropriate safety factor. The Agency uses a safety factor of 1000 to calculate the PADI when the NOEL is based upon a subchronic study. For the present time, the best available source for determining a PADI is the subchronic 90-day feeding study in the rat, which was received shortly before the lindane RPAR was completed. This study, which meets current Guideline criteria (cited above), shows that lindane causes toxicity related changes, primarily in the kidneys but also in the liver, of male and female rats. Renal changes, which included tubular degeneration, hyaline droplets, tubular casts, tubular distention, interstitial nephritis, and basophilic tubules, were irreversible with a NOEL of 4 ppm in the diet which is equivalent to 0.3 milligrams per kilogram of body weight per day (mg/kg/day). Hypertrophy was the only dose-related liver change noted. Using the 0.3 mg/kg/day NOEL and a safety factor of 1,000, the PADI for lindane has been determined to be 0.0003 mg/kg/day. When the results of an acceptable rat chronic study are available, the Agency can determine an ADI for lindane.

3. Although the Agency is unable to complete a tolerance reassessment because of certain residue chemistry and toxicology data gaps, the Agency concludes that no changes in present tolerances are indicated at this time. However, the Agency is requiring submission of data regarding residues resulting from seed treatment uses and, based on review of those data, may require tolerances for those uses to be established. Because of the Agency's concerns about the possibility of human health effects due to dietary exposure to lindane and the lack of data to support current tolerances, no additional tolerances, other than those required to support the existing seed treatment uses, will be considered until the data gaps identified in this Standard are filled.

Rationale: As noted in item 2 above, the NOEL for lindane has been lowered since the issuance of PD-4 based upon receipt of the subchronic feeding study in rats. The NOEL determined from this study is 0.3 mg/kg/day. Using this value and a safety factor of 1,000, a PADI for lindane of 0.0003 mg/kg/day has been calculated. The Maximum Permissible Intake (MPI), or maximum allowable daily dietary intake of residues for a given pesticide which, based upon laboratory animal studies, should not produce any adverse effects, is calculated by multiplying the ADI or PADI times the body weight of the individual. For a 60 kilogram (132 pound) person, the MPI of lindane is 0.018 mg/day. The percentage of the MPI used by the Theoretical Maximum Residue Concentration (TMRC), which is derived from the sum of all existing tolerance values, is 7,883%. Exceeding the MPI with the TMRC does not in and of itself necessarily represent an immediate public health hazard. The actual residue levels of lindane to which the public is exposed are likely to be significantly less than indicated by the TMRC for reasons which include the following: a) the Food and Drug Administration (FDA) market basket surveys indicate that the actual residues of lindane are far below the established tolerances and that less than one percent (0.7%) of the MPI is actually used; b) not every individual crop for which a tolerance has been established is treated with lindane; c) not every crop that actually is treated with lindane is treated at the maximum allowable rate or with the minimum pre-harvest interval; d) not all livestock animals to which this pesticide may be applied are actually treated with lindane; e) washing or peeling food for consumption would reduce residue levels; and f) not all the crops contributing to the MPI are likely to be consumed by an individual.

No tolerances exist for the seed treatment uses of lindane because they were not required at the time these uses were registered by USDA. USDA had concluded, based upon the analytical methodology available at that time, that no residues were or would be present in plants as a result of seed treatment by any pesticide. Thus, all seed treatments were considered to be non-food uses. EPA now considers that tolerances should be established for all seed treatment uses unless it can be shown by data from a radiolabeled chemical study that no uptake of residues occurs from the treated seeds into the aerial or edible portion of the growing crop.

EPA will reassess existing tolerances after review of the required residue data, including identification of metabolites in plants and livestock and determination of the residue levels, if any, that may be present in the edible portion of food crops as a result of seed treatment, and will establish an ADI after review of the required rat chronic feeding study. Until these studies are evaluated and an ADI set, no additional tolerances for lindane will be considered, other than those required to support the existing seed treatment uses.

4. As a result of the RPAR process, the Agency concluded that the genotoxic potential of lindane could not be determined from available data. Therefore, the Notice of Intent to Cancel Pesticide Products Containing Lindane (48 FR 48512, October 19, 1983) required the submission of additional studies. The consortium of lindane producers, Centre International d'Etudes du Lindane (CIEL), agreed to perform special mutagenicity tests

for lindane which would optimize conditions for activation of this chemical and would provide especially sensitive conditions for detecting mutagenic endpoints so that an assessment of its genotoxic potential could be made. The Agency has completed its review of these studies. Based upon evaluation of all available mutagenicity data on lindane, including the new studies, the Agency has concluded that lindane does not appear to produce mutagenic effects. No further mutagenicity studies are required.

Rationale: The recent mutagenicity tests submitted by CIEL appear to confirm that lindane has little or no genetic activity, even when subjected to sensitive tests for detecting DNA events with special provisions for activation. Lindane was negative in the Ames test in the presence of a microsomal metabolic activation system (S-9) from the tumor-susceptible CF-1 mouse strain. Metabolic systems for Ames testing were manipulated so as to enhance the possibility of activation of lindane and improve the availability of its active metabolites. Lindane was also negative in mammalian assays for gene mutation and for Sister Chromatid Exchanges in CF-1 mice by the oral and parenteral (intraperitoneal) routes.

5. Since the issuance of PD-4, the Agency has published Proposed Guidelines for Carcinogen Risk Assessment (49 FR 47294, November 23, 1984). The Carcinogen Assessment Group (CAG) of the Office of Research and Development (ORD) of the EPA has reassessed the oncogenic potential of lindane using these new guidelines and the results of the new mutagenicity tests that show lindane is not genotoxic. Based on the weight of evidence, CAG has classified lindane in the range B2-C. Pending receipt of the required rat oncogenicity study, the Agency will regulate lindane as a class C carcinogen.

Rationale: CAG was requested to review the weight of evidence for carcinogenicity of lindane given the results of the new mutagenicity testing. Using the new Proposed Guidelines for Carcinogen Risk Assessment (cited above), CAG has classified lindane as "B2-C" (i.e., in between the lower half of the "B" category of "probable" and the "C" category of "possible" carcinogen classifications) based upon evidence that lindane gives rise to malignant liver tumors in two strains of mice, plus supportive evidence of pre-cancerous liver lesions in shorter term studies. This weight of evidence classification also included consideration that, on the one hand, 1) at least one study was positive in both sexes and that 2) a lindane metabolite is oncogenic, while, on the other hand, and leaning the classification toward class "C", that 3) lindane has not been shown to be genotoxic after extensive testing, and 4) none of the oncogenicity studies showed a dose-response relationship. OPP believes that the weight of evidence is closer to a "C" class than to a "B2" class carcinogen. This will be reassessed based on the results of the required rat oncogenicity study (see item 6 below). Therefore, pending the results of this study, OPP will regulate lindane as a class C carcinogen.

6. The Agency has determined that its data base on possible oncogenic effects of lindane is not complete. While lindane has been determined to be associated with increased incidences of liver tumors in at least two studies using mice, the Agency does not have a comparable acceptable study conducted with rats. The Agency requires submission of an additional rat oncogenicity study but does not require submission of an additional mouse bioassay.

Rationale: The Agency has reviewed the data base for oncogenicity in the rat. The available data do not meet current acceptability criteria or permit definitive decisions on the oncogenic potential of lindane in the rat. Therefore, the Agency is requiring that a rat oncogenicity bioassay be performed. Since the previous mouse bioassays, although individually not meeting the current Guideline criteria (Pesticide Assessment Guidelines, Subdivision F, Hazard Evaluation: Human and Domestic Animals; November 1982), when considered together indicate the oncogenic nature of lindane in mice, CAG was asked to consider whether another mouse bioassay of lindane, meeting current Guideline requirements, was needed. CAG indicated that while another mouse study might improve the basis of the quantitative risk assessment, it would not change the conclusion that lindane causes cancer in mice. The Agency does not believe that an additional mouse study would refine the quantitative risk assessment enough to justify the additional cost of doing another study, because of the inherent uncertainty associated with low-dose extrapolations for humans from mouse liver tumors.

7. Lindane has been associated with possible induction of aplastic anemia (a more specific term for blood dyscrasias). The Agency is requiring a laboratory animal study to determine if a cause and effect relationship exists between exposure to lindane and the formation of blood dyscrasias.

Rationale: PD-4 of the lindane RPAR concluded that the available epidemiological data did not permit a cause and effect relationship to be established betweeen lindane and aplastic anemia. The possibility that lindane may induce aplastic anemia in certain susceptible humans still exists. Therefore, the Agency is requiring submission of a laboratory animal study to permit an assessment of lindane's potential to cause blood dyscrasias. Registrants must contact the Agency within 90 days of receiving this Guidance Document to discuss the study, and then must submit a proposed protocol, together with a projected schedule, for Agency approval prior to actually conducting the testing.

8. The Agency has recalculated the exposure to applicators, Margins of Safety (MOS) relative to toxic effects, and estimates of the 95% upper confidence level for excess cancer risk for the various registered uses of lindane. While the new calculations for most uses do not indicate any significant changes that would warrant additional regulatory action at this time, the Agency is concerned about the potential risks to applicators and mixer/loaders for the forestry use and to applicators spraying uninhabited buildings and empty storage bins. Based on its reassessment of exposures to these workers, the Agency has decided to commence Special Review for those use patterns. The uses will continue to be registered during the period of Special Review, provided protective clothing is worn by applicators and mixer/loaders. The protective clothing requirements for the forestry use as detailed in the Final Notice of Determination of the lindane RPAR will continue. Protective clothing requirements, including use of an approved respirator, must be added to those end-use products with directions for use in uninhabited buildings and/or empty storage bins.

Rationale: The Agency has reassessed the exposures to applicators for the use patterns detailed in PD-4 using current methodology, surrogate studies, and the lower NOEL from the subchronic rat feeding study for those use patterns of a subchronic nature, such as the 30 days of exposure per year associated with the forestry use. The estimates of the upper 95% confidence level for excess cancer risk are based on CAG's recalculation of the potency (Q_1*) of lindane. The new Q_1* value used in calculating cancer risk is 1.1 $(mg/kg/ day)^{-1}$, a very small change from the old Q_1* of 1.3 $(mg/kg/day)^{-1}$. In addition, the Agency has now calculated the exposures for mixer/loader or combined mixer/loader/applicator for three uses where this practice is customary, which includes the forestry use. Exposure calculations for these workers were not included in PD-4. Current calculations for dermal and respiratory exposures, together with a comparison of PD-4 and current MOS values and cancer risk estimates, are presented in Table 1. Based upon the low MOS (the ratio of the NOEL to exposure) that is associated with the forestry use, both to applicators and mixer/loaders (especially those servicing more than one applicator), and to applicators spraying uninhabited buildings and empty storage bins, the Agency has decided to commence Special Review for these uses. The Agency finds that continued registration of these uses during the time necessary to complete a Special Review will not cause unreasonable adverse effects on man or the environment, provided that protective clothing requirements are stipulated on labeling in order to reduce exposure in the interim. The protective clothing requirements for the forestry use, detailed in the Final Notice of Determination of the lindane RPAR, will continue. Protective clothing requirements, including use of an MSHA/OSHA approved respirator, must be added to those end-use products with directions for spraying uninhabited buildings and/or empty storage bins.

Table 1
Exposures and Risk Factors Associated with Lindane Uses Based on Current Exposure Calculations and Toxicology Data

	Number of days exposed per year	Daily Exposure (mg/kg) with protective clothing required by current labels		Margin of Safety1/		Cancer Risk2/	
		Dermal	Respiratory	Current	PD-4	Current	PD-4
ornamentals (commercial)	4	0.13	8.6×10^{-4}	400*	280	8×10^{-5}	1×10^{-4}
avocados	2	0.27	2.3×10^{-3}	200*	99	8×10^{-5}	2×10^{-4}
pecans: applicator	1	0.57	Negligible	90*	99	8×10^{-5}	7×10^{-5}
mixer/loader	1	0.46	Negligible	110*		7×10^{-5}	
combined	1	1.0	Negligible	50*		1×10^{-4}	
livestock	1	0.11	1.5×10^{-4}	450*	448	2×10^{-5}	2×10^{-5}
ornamentals (homeowners)	1	5.4×10^{-2}	5×10^{-4}	5,000*	3,846	8×10^{-6}	2×10^{-6}
forestry: applicator	30	0.10	1.8×10^{-3}	25	1,767	4×10^{-4}	1×10^{-4}
mixer/loader3/	30	0.15–0.93/	Negligible	3–203/		4×10^{-3}–7×10^{-4} 3/	
combined	30	0.25	1.8×10^{-3}	11		1×10^{-3}	
Xmas trees-foliar	1	6.8×10^{-2}	1.2×10^{-3}	700*	500	1×10^{-5}	1×10^{-5}
seed treatment: applicator	2	9.3×10^{-3}	8.6×10^{-5}	5,000*	5,000	3×10^{-6}	3×10^{-6}
seed sowing	2		1.7×10^{-3}	3,000*	2,941	5×10^{-6}	5×10^{-6}

Table 1 (continued)

	Number of days exposed per year	Daily Exposure (mg/kg) with protective clothing required by current labels		Margin of Safety[1/]		Cancer Risk[2/]	
		Dermal	Respiratory	Current	PD-4	Current	PD-4
dog dust:							
applicator	2	4x10^{-3}	3x10^{-5}	1,200*	11,628	1x10^{-6}	1x10^{-6}
residents	6		8.6x10^{-5}	60,000*	52,140	4x10^{-7}	4x10^{-7}
cucurbits							
applicator	3	2.4x10^{-2}	8.6x10^{-6}	2,000*	28,736	1x10^{-5}	2x10^{-7}
mixer/loader	3	6.6x10^{-2}	Negligible	150*		1x10^{-4}	
combined	3	7.1x10^{-2}	8.6x10^{-6}	140*		2x10^{-4}	
Xmas trees(stump-slash)	1	0.14	2.2x10^{-3}	360*	256	2x10^{-5}	3x10^{-5}
pineapples	1		9.7x10^{-8}	500,000*	1,000,000	2x10^{-10}	2x10^{-10}
flea collars[4/]	365		1.6x10^{-6}	35,000	145,349	4x10^{-6}	7.2x10^{-6}
shelf paper	365		1.2x10^{-5}	25,000	725,000	1x10^{-5}	2.1x10^{-6}
homesprays:							
applicator	1	9x10^{-4}	6.3x10^{-4}	7,000*	1,520	2x10^{-6}	4.4x10^{-6}
residents	3		8.6x10^{-5}	60,000*	55,556	4x10^{-7}	4.2x10^{-7}
hardwood logs	200		1.3x10^{-3}	230	962	4x10^{-4}	3.6x10^{-4}
dog dips:[5/]							
applicator	12	1.2x10^{-3}		2,500*	71,667	2x10^{-6}	4.2x10^{-6}
residents	3		8.6x10^{-5}	60,000*	58,140	N/A[6/]	4.2x10^{-7}
dog shampoos:							
applicator	1	3x10^{-2}		1,700*	1,562	5x10^{-6}	4.5x10^{-6}
residents	3		8.6x10^{-5}	60,000*	58,140	N/A[6/]	4.2x10^{-7}

Table 1 (continued)

	Number of days exposed per year	Daily Exposure (mg/kg) with protective clothing required by current labels		Margin of Safety[1/]		Cancer Risk[2/]	
		Dermal	Respiratory	Current	PD-4	Current	PD-4
crawlspace sprays: applicator	5	$1.5x10^{-3}$	$7.7x10^{-4}$	20,000*	5,435	$7x10^{-6}$	$7x10^{-6}$
residents	30		$6.9x10^{-4}$	430	7,246	$6x10^{-6}$	$6x10^{-6}$
moth sprays: applicator[7/]	26	$1.8x10^{-3}$	$2.6x10^{-5}$	1,500	37,425	$3x10^{-5}$	$5x10^{-5}$
applicator[8/]	26	$(3.6x10^{-4})$	$(2.6x10^{-5})$	(5,000)		$(1x10^{-5})$	
employees	225		$3x10^{-4}$	1,000	55,556	$1x10^{-4}$	$3x10^{-5}$
uninhabited buildings & empty storage bins: applicator[9/]	12	0.17	$7x10^{-4}$	20	121,957	$3x10^{-4}$	$6.4x10^{-7}$
applicator[10/]	12	$(3.4x10^{-2})$	$(7x10^{-4})$	(75)		$(7x10^{-5})$	
applicator[11/]	12	$(3.4x10^{-2})$	$(7x10^{-5})$	(90)		$(6x10^{-5})$	

1/ Margin of Safety (MOS) is the ratio of No Observed Effect Level (NOEL) to Exposure, i.e., NOEL/Exposure. The current MOS value is associated with the subchronic NOEL of 0.3 mg/kg unless the value is followed by an asterisk. The asterisk indicates that the exposure is acute (only a few days per year) and the MOS is associated with the maternal/fetotoxic NOEL of 5 mg/kg, as in PD-4.

2/ Estimate of the upper 95% confidence level for excess cancer risk.

3/ MOS of 20 and a cancer risk of $7x10^{-4}$ if the mixer/loader is servicing only one applicator; MOS of 3 and a cancer risk of $4x10^{-3}$ if the mixer/loader is servicing six applicators.

4/ The number of days exposed per year and the cancer risk for dog dip applications have been adjusted from that in PD-4 to conform with the new labeling restrictions. "Residents" refers to persons whose pets have recently been treated.

5/ Agency records indicate that there are no remaining registrations for lindane flea collars.

6/ N/A = Exposure data not available. The Agency is requiring exposure data under this Standard.

7/ Exposure and risks calculated based on current label for use of an MSHA/OSHA approved respirator.

8/ Exposure and risks calculated based on additional protective clothing requirements in addition to use of an MSHA/OSHA approved respirator.

9/ Exposure and risks calculated based on current label without any protective clothing requirements.

10/ Exposure and risks calculated based on additional protective clothing requirements but without use of an MSHA/OSHA approved respirator.

11/ Exposure and risks calculated based on additional protective clothing requirements plus use of an MSHA/OSHA approved respirator.

9. The Agency is concerned about the potential risks to applicators from the hardwood lumber dipping use, but will not decide whether to commence a Special Review until the acute and 90-day inhalation studies and the chronic rat study required under this Standard are evaluated. The Margin of Safety (MOS), the ratio of the NOEL to exposure, for this use has been recalculated based on the lower NOEL from the rat subchronic study. The Agency's estimate of the upper 95% confidence level for excess cancer risk from applicator exposure for this use of lindane is 10^{-4}.

Rationale: The PD-4 estimated the upper 95% confidence level for excess cancer risk to hardwood lumber applicators using protective clothing to be 10^{-4}. This risk level was considered acceptable given that the benefits from the use are significant, the number of applicators is low (1,000-2,000), and there is a lack of alternative physical or chemical control measures. Unlike softwood lumber, hardwood lumber cannot be heat cured. The one possible alternative pesticide (endosulfan) which was previously registered for spray application to felled logs, but not for use as a dip for lumber, may no longer be considered, since the registrants of endosulfan manufacturing-use products have recently decided not to support the forestry (felled logs) use and have removed this use pattern from their labels.

Based on the NOEL level of 0.3 mg/kg/day established for kidney effects in the recent subchronic rat study, a Margin of Safety has been calculated at 230. Given that some workers may be exposed for 200 days per year, and that extrapolation of chronic risk based on a subchronic study should allow a 1000-fold safety factor, this Margin of Safety may not be adequate to protect against kidney damage. Moreover, because inhalation is the major route of exposure for the hardwood lumber use, further information on inhalation toxicity (both acute and 90-day exposure) is needed to better characterize the risk. Without additional data, the risk calculations are tentative, and a regulatory decision at this point regarding initiation of Special Review would be premature. A rat chronic feeding study is also required to determine the levels of kidney effects resulting from long term exposure and to investigate the possibility that these effects might be reversible.

10. The Agency is concerned about the potential risks to applicators using powered spray equipment for overhead spraying of ornamentals (commercial application), avocados, and pecans. The estimates of the upper 95% confidence level for excess cancer risk for applicator exposure from these uses are in the 10^{-4} range, as in PD-4. The Agency has recalculated the Margins of Safety (MOS) based on current exposure models and surrogate studies. The newly calculated Margins of Safety

for applicators for these uses are as follows: a) commercial ornamentals 400; b) avocados 200; and c) pecans 90 (applicator) and 110 (mixer/loader). Reassessment of the Margins of Safety will be made after receipt and evaluation of an adequate chronic feeding study in rats and acute and 90-day inhalation studies.

Rationale: PD-4 contained tabulations of risk associated with non-dietary exposures to applicators and bystanders. The ornamental, avocado, and pecan uses were considered as acute type exposures (only a few days per year). The one product with the avocado use pattern was voluntarily cancelled after the issuance of PD-4. Agency records do not show any other currently registered product with this use pattern, but because there is still a tolerance for this crop, and another registrant may decide to support its use, the Agency will continue to include this crop in this listing of uses of concern.

Considering the few days of applicator exposure per year that are associated with the ornamental, avocado, and pecan uses, the Margins of Safety (MOS) from PD-4, which were based on acute effects, are more representative of the actual exposure risks from these uses than would be revisions to the MOS based upon the NOEL from the subchronic toxicity study that was received at the conclusion of the lindane RPAR. Because the Agency is using acute studies to estimate acute risks, a 100-fold safety factor is acceptable. The Agency has, however, recalculated the MOS using current exposure models and assumptions. Only minor revisions in the MOS values resulted from these recalculations (see Table 1). Also, the Agency has calculated the MOS for a mixer/loader for the pecan use, a calculation that had not appeared in PD-4. The MOS for this activity (110) is similar to that for the applicator (90). The estimates of the upper 95% confidence levels of excess cancer risk to applicators from these overhead power spray uses remain unchanged from PD-4. Although the risks are significant, the benefits offset these risks and no further regulatory action is necessary.

11. Because of the high potential for dermal exposure to lindane from those uses which do not require use of protective clothing, the Agency is requiring a dermal sensitization and a 21-day dermal toxicity test. As in PD-4, the Agency will use a 10% dermal absorption value for risk calculations. The use pattern with the highest dermal exposure potential, the dust products for use only by the military for both clothing and direct skin application must be supported by an additional 90-day dermal study.

Rationale: Data from a dermal sensitization study and a 21-day dermal toxicity test are required by 40 CFR 158 to support the registration of each manufacturing-use product and each end-use product which will result in repeated human skin contact under conditions of use. Uses for lindane that do not require protective clothing and which might result in repeated human skin contact, such as the use on cucurbits, trigger the requirements for submission of a dermal sensitization and a 21-day dermal toxicity study. This Standard uses a value of 10% for dermal absorption of lindane on the basis of a human study (conducted by Maibach et al.). The use of lindane dust on humans and/or clothing is registered for use only by the military, and the Army has indicated that it will be used only on an emergency basis. Nevertheless, because of the high potential for exposure that results from direct application to skin or from clothing that is dusted and then immediately placed in contact with the skin, the Agency is requiring an additional longer term (90-day) dermal toxicity test. This use pattern was not considered in the RPAR review of lindane.

12. Several of the use patterns for lindane can result in potential exposure to lindane vapors, often over extended periods of time. Therefore, the Agency is requiring the submission of of a 90-day inhalation study.

Rationale: Registered uses of lindane include products intended for repeated indoor uses in the form of aerosols and sprays. A 90-day inhalation study is required to support these uses, as well as the greenhouse uses on food and non-food crops (which were not part of the RPAR), plus other uses such as soil treatment and subterranean termite control (Note - the Agency has already issued a 3(c)(2)(B) Data Call-In Notice for long-term air monitoring studies to support the termiticide use). A 90-day inhalation study is also being required to support the military use dust products, based on the likelihood of exposure to vapors from the treated skin and clothing.

13. The question of lindane's potential to induce teratogenic and reproduction effects was raised in PD-1 but was successfully rebutted by submission of data as discussed in PD-4. No further teratogenic or reproduction testing with lindane is required.

Rationale: The potential of lindane to induce teratogenic and fetotoxic effects has been adequately characterized by studies in the rat, rabbit and mouse in which the routes of administration were by gavage and subcutaneous injection. No teratogenic effects were noted in these studies; therefore, no further teratogenicity testing is required for lindane.

Fetotoxic effects were seen only at doses which also caused maternal toxicity. An oral intubation (gavage) study in rats indicated a NOEL of 5 mg/kg/day for maternal effects, which is one half the NOEL of 10 mg/kg/day for fetal effects. Similar results were noted in a gavage study using rabbits, while a gavage study in mice indicated that both the maternal and fetal NOEL was 30 mg/kg/day. Doses up to 100 ppm produced no adverse reproductive effects in rats fed lindane for three generations. No further reproduction testing is required for lindane, since available data indicate that protecting mothers from acute toxic effects will simultaneously protect fetuses from possible adverse effects.

14. A concern has been raised that the manufacturing process for lindane may result in the production of dioxins. The Agency is requiring the submission of analytical results and a discussion on the formation of unintentional ingredients produced during manufacturing, packaging, or storage.

Rationale: The Agency does not have complete information on the specific manufacturing processes for lindane, including the identification and quantification of all components that may be produced other than the active ingredient. There is a possibility that the manufacturing process for lindane could, theoretically, result in the production of dioxins, at a low level. However, based on information currently available to the Agency, the Agency believes that the likelihood of any dioxins being present in the manufacturing-use product is remote. To confirm the current information, the Agency is requiring a narrative Discussion of Formation of Unintentional Ingredients, with special attention to the potential for formation of dioxins and dibenzofurans, and results of actual analyses to identify and quantify all components present at greater than 0.1%. After review of this information, the Agency will determine the potential for occurrence of dioxins or dibenzofurans in manufacturing-use products of lindane. If there is reasonable likelihood for the formation of these compounds, the Agency will require additional chemical analysis to determine the identity and quantity of the compounds.

15. Lindane is highly toxic to some aquatic organisms, but risks from various uses cannot be assessed from data that are currently available. Submission of data from a full complement of environmental fate studies is being required at this time.

Rationale: Available data are insufficient to fully evaluate the environmental fate of lindane. The following data are required to fully assess the environmental fate and transport of lindane as well as the potential for exposure: hydrolysis, photodegradation in water and on soil, aerobic and anaerobic soil metabolism, leaching and adsorption/desorption, laboratory volatility, terrestrial and forestry dissipation, and accumulation in rotational crops, fish, and non-target aquatic organisms.

16. The Agency is concerned about the potential for exposure of non-target aquatic organisms to lindane through drift or runoff. An aquatic residue monitoring study is being required at this time to assess the levels of lindane entering aquatic ecosystems. Additionally, the two labeling requirements implemented pursuant to the Notice of Intent to Cancel Pesticide Products Containing Lindane to limit the exposure of aquatic organisms to lindane will continue. Specifically, the prohibition against aerial application of lindane, and the requirement for directions pertaining to the disposal of dip solutions in accordance with the Resource Recovery and Conservation Act (RCRA), will continue as requirements.

Rationale: The Agency's original presumption regarding lindane's acute toxicity to aquatic organisms was withdrawn in PD-2/3 because no lindane products were registered for aquatic uses. At that time, the Agency stated its concerns regarding the contamination of aquatic habitats by drift or runoff from terrestrial use sites or from improper disposal of wastes. In the Notice of Intent to Cancel the Agency addressed these issues by prohibiting aerial application and by requiring special disposal instructions (in compliance with RCRA) for used dip solutions resulting from the hardwood log and livestock dip use patterns. Since no new information has been submitted to change the Agency's conclusions in these regards, the label statements will continue as a requirement to protect non-target aquatic organisms. In order to obtain information relative to the actual levels of lindane entering the aquatic ecosystem, the Agency is requiring an aquatic residue monitoring study that includes measurements on both spray drift (from the spraying of trees, especially pecans), and runoff (from terrestrial crop applications).

17. Lindane appears to be moderately toxic to some birds and there is concern that some seed treatments may present a hazard to birds. Residue levels on other avian food items have not yet been determined. The Agency is requiring both an acute avian toxicity study and two subacute dietary studies at this time. The labeling requirements for statements that exposed treated seeds may be hazardous to birds and other wildlife, and to dispose of all treated seeds by burial away from bodies of water, will continue.

Rationale: The available studies on the acute toxicity of lindane to birds, although sufficient to characterize lindane as moderately toxic on an oral basis to starlings and red-winged blackbirds and practically non-toxic to mallard ducks, do not meet current Agency requirements (Pesticide Assessment Guidelines, Subdivision E, Hazard Evaluation: Wildlife and Aquatic Organisms; November 1982). Therefore, the Agency is requiring a single-dose oral study on upland game birds (bobwhite quail). Since there is the potential for longer term exposure of upland game and passerine birds to subacute doses of lindane by ingestion of treated seeds, two subacute avian dietary studies, on bobwhite quail and red-winged blackbird, are also being required at this time. If the data from these studies indicate that treated seeds present a significant hazard, then more labeling precautions beyond the present statements will be necessary. The requirement for an avian reproduction study is being reserved pending evaluation of the required environmental chemistry data that would indicate the residues of lindane on avian food items.

18. The Agency is concerned about the potential exposure of residents and workers to airborne residues of lindane that may result from termiticide treatment of residences and workplaces. As part of the Agency's review of termiticides, certain data requirements have been imposed.

Rationale: As with all termiticide treatments, there is potential exposure not only to applicators, but also to occupants of treated buildings. In order to evaluate the extent and possible effects of this exposure, the Agency has initiated a review of all termiticides, including lindane. To date, none of the registrants of lindane manufacturing-use products has submitted the required long term indoor air monitoring studies in response to the 3(c)(2)(B) data call-in letter issued February 23, 1984. Instead, registrants have elected to delete the termiticide use from the listing of all the acceptable use patterns for end-use products that may be formulated from their manufacturing-use products. Since a data gap still exists, registrants of end-use products have been notified, through a 3(c)(2)(B) letter, to make known their intentions of submitting the indoor air monitoring study. If no end-use product registrant elects to submit the required data, the use pattern will have to be removed from labeling or the products in question will be suspended.

19. The Agency is concerned about potential dermal or inhalation exposure of applicators and residents (including occupants of treated homes or offices, as well as dog owners whose pets have been treated with products containing lindane), resulting from certain use patterns. The Agency is requiring applicator exposure data for manual seed treatment, livestock spraying, structural treatment, dog wash, dog shampoo, and dog dust uses. Exposure data for residents, in the form of air

monitoring studies, are being required for the structural treatment, dog wash, dog dust, and dog shampoo uses. Exposure data must also be submitted, in addition to the toxicology data requirements discussed earlier (items 11 and 12 above), to support the use of lindane dust by the military on human skin and/or clothing. Registrants must submit appropriate protocols for the above studies within 90 days of receipt of this Standard. Results of the actual studies will be due 6 months after the protocols are approved by the Agency.

Rationale: Adequate data are not available to characterize applicator exposure during manual seed treatment, livestock spraying, structural treatment of buildings, and shampooing, washing, or dusting dogs with products containing lindane. Additionally, there are no adequate exposure data, in the form of air monitoring studies, to determine the levels of pesticide exposure to residents occupying buildings that have undergone structural treatment with lindane, or to dog owners following treatment of their pet with a dog wash, a dog shampoo, or a dog dust product containing lindane. The current registrations for military use of lindane dust on human skin/clothing are not supported by exposure or toxicology data. Since the Agency has not yet issued Guidelines for exposure studies, registrants are referred to the four general background articles ("Minimizing Occupational Exposure to Pesticides", "Dermal Exposure to Pesticides: EPA's Viewpoint", "Use of Exposure Data for Risk Assessment", and "Exposure Assessment for Agricultural Chemicals") that are enclosed with this Standard, for information on how monitoring studies and quantitative exposure assessments are carried out. Registrants must submit appropriate protocols for these exposure studies within 90 days.

20. Since the Agency has concerns about the potential health effects of lindane, and since there are agricultural uses of this pesticide that could involve substantial dermal contact with residues on treated foliage, the Agency is requiring submission of data under 40 CFR 158.140 to make judgements as to the need for worker protection standards, such as reentry intervals and personal protective equipment. Until the required foliar dissipation data are submitted and reviewed, a 24-hour reentry interval is being required for use of lindane on crops in which hand labor is required following foliar application.

Rationale: Reentry data are required by 40 CFR 158.140 for toxic pesticides which have use patterns likely to result in high dermal and/or inhalation exposure to persons entering pesticide treated fields. Lindane is a assumed to be a persistent chemical, and there are agricultural uses that could involve substantial, prolonged human exposure to the residues on foliage. There are not sufficient data available for the Agency to make judgements as to the need for farmworker protection standards, such as reentry intervals. The crops for which foliar dissipation data are required are those whose propagation requires human tasks that involve substantial, prolonged, dermal contact with pesticide treated surfaces following foliar application of lindane. Data to address this concern are lacking and are being required.

Until the required data are submitted and evaluated, a 24-hour reentry interval is required for use on crops in which hand labor is required following foliar application of lindane. End-use products with directions for use on such crops must include the label statements required under PR Notices 83-2 and 84-1. A 24-hour reentry interval must be included in the required written or oral warnings given to farmworkers.

21. The Agency has identified certain data requirements that will receive priority review when received.

Rationale: Certain data are essential to the Agency's assessment of this pesticide and its uses and/or may trigger the need for further studies which should be initiated as soon as possible. The following studies have been identified to receive priority review as soon as they are received by the Agency:

§158.135 Toxicology

81-3 Acute Inhalation Toxicity
82-4 90-Day Inhalation
83-1 Chronic Toxicity (rat)
83-2 Oncogenicity (rat)
85-1 Blood Dyscrasias (laboratory animal)

§158.125 Residue Chemistry

171-4 Nature of Residue in Plants
171-4 Nature of Residue in Livestock
171-4 Magnitude of the Residue (all crops with this requirement)

§158.130 Environmental Fate

161-1 Hydrolysis
161-2 Photodegradation in Water
161-3 Photodegradation on Soil
162-1 Aerobic Soil Metabolism
163-2 Volatility (laboratory)
165-1 Rotational Crops (confined)

§158.130 Environmental Fate (Continued)

165-4	Accumulation in Fish (laboratory)
	Exposure to Applicators
	Exposure to Residents
	Human Skin/Clothing Exposure

§158.145 Ecological Effects

70-1	Special Test - Aquatic Residue Monitoring
71-1	Acute Avian Oral Toxicity
71-2	Subacute Avian Toxicity
72-1	Freshwater Fish Toxicity
72-2	Acute Toxicity to Freshwater Invertebrates
72-3	Acute Toxicity to Estuarine & Marine Organisms
72-4	Fish Early Life Stage
72-4	Aquatic Invertebrate Life Cycle
141-2	Honey Bee - Toxicity of Residues on Foliage

D. Criteria for Registration under the Standard

To be acceptable for registration under this Standard, manufacturing-use products must contain lindane as the sole active ingredient (solvents or diluents should be declared as inerts), bear required labeling, and conform to the product composition, acute toxicity limits, and use pattern requirements as indicated in Section E of this document. The applicant for registration or reregistration of products subject to this Standard must comply with all terms and conditions described in it, including submission of an up-to-date Confidential Statement of Formula, submission of revised labeling, commitment to fill data gaps on the schedule specified by the Agency and, when applicable, offer to pay compensation as required by 3(c)(1)(D) and 3(c)(2)(D) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended, 7 U.S.C. 136(c)(1)(D) and 136(c)(2)(D).

E. Acceptable Ranges and Limits

1. Product Composition Standard

To be registered under this Standard, manufacturing-use products (MP) must contain lindane as the sole active ingredient (solvents or diluents should be declared as inerts). Technical products must contain at least 99% lindane. Each MP formulation proposed for registration must be fully described with an appropriate certification of limits, stating maximum and minimum amounts of the active ingredient and any intentionally-added inert ingredients which may be present in the product.

2. Acute Toxicity Limits

The Agency will consider registration of technical grade and manufacturing-use products containing lindane, provided that the product labeling bears the appropriate precautionary statements for the acute toxicity category in which each product is placed.

3. Use Patterns

To be registered under this Standard, manufacturing-use products containing lindane may be labeled for formulation into end-use products only for the use patterns and commodities listed in the "EPA Index to Pesticide Chemicals", section II-H of this Standard.

Note that each of the agricultural commodities, as well as any associated processed food/feed items, has outstanding residue chemistry data requirements to support tolerances. In addition, other data requirements pertinent to the type of use pattern may be applicable, as indicated in Tables A and B. No use may be included on the label where the registrant(s) fails to agree to comply with the data requirements in either Table A or Table B for that use pattern.

F. Required Labeling

All manufacturing-use and end-use lindane products must bear appropriate labeling as specified in 40 CFR 162.10. This Guidance Document contains information on label requirements. All labeling changes must be accepted by the Registration Division, Office of Pesticide Programs, and must appear on all products released for shipment after June 30, 1986. All labeling changes must must appear on all products in channels of trade as of December 30, 1986. In addition to the requirements of 40 CFR 162.10, the following items must appear on the labeling:

1. Labeling for Manufacturing-Use Products

a. The ingredient statement for manufacturing-use products must declare the active ingredient as:

Lindane (gamma isomer of benzene hexachloride) __%

b. Labels for manufacturing-use products must bear the following identifying phrase directly beneath the product name:

"An insecticide for formulating use only"

c. Labels for manufacturing-use products must bear statements reflecting the compound's acute human toxicity. Lindane is in Toxicity Category II by the oral route of exposure; the required precautionary statements associated with this category are specified in 40 CFR 162.10.

d. All manufacturing-use lindane products must state in the directions for use that they are intended for formulation into end-use products for the aforementioned use patterns. Labeling must specify sites, which are listed in Use Patterns, Section E.3. A limiting factor will be data that supports these use patterns. No use may be included on the label where the registrant fails to agree to comply with the data requirements in either Table A or Table B for that use pattern.

e. The directions for use must include the following statement:

"Formulators using this product are responsible for obtaining EPA registration for their formulated product(s)."

f. Detailed instructions for formulating may be omitted from the manufacturing-use product label provided that information pertinent to the needs of the formulators, including, but not limited to, physical and chemical properties of the product is included on the labeling. If such information is stated in labeling other than directly on the product label, a reference statement such as "Refer to Technical Bulletin X for formulating and other information" must appear on the label and the technical bulletin must be submitted with the product label for Agency review.

g. Labels for manufacturing-use products must bear the following statements under the heading "Environmental Hazards":

> "This pesticide is toxic to fish, birds and other wildlife. Do not discharge effluent containing this active ingredient into lakes, streams, ponds, estuaries, oceans or public waters unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA."

h. Lindane products are "toxic" hazardous wastes when discarded. The following pesticide disposal statement must appear in the "STORAGE AND DISPOSAL" section of the label:

> "PESTICIDE DISPOSAL: Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label directions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance."

2. Labeling for End-Use Products*

a. Products with directions for use for avocados, pecans, livestock (sprays), forestry, Christmas trees, commercial ornamentals, structural treatment, dog dusts, and dog shampoos are classified for restricted use based on oncogenicity.

The following "Restricted Use" statement must appear on the label of all lindane products that are classified for restricted use:

> RESTRICTED USE PESTICIDE
>
> The use of this product may be hazardous to your health. This product contains lindane, which has been determined to cause tumors in laboratory animals. Risks can be reduced by closely following the use directions and precautions, and by wearing the protective clothing specified elsewhere on this label.
>
> For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.

b. The ingredient statement for all end-use products must declare the active ingredient as:

Lindane (gamma isomer of benzene hexachloride) ___%

c. Products with directions for use on commercial ornamentals, avocados, pecans, livestock (sprays only), forestry, and Christmas trees must bear the following statement:

"Aerial application of lindane is prohibited."

d. Pursuant to PR Notices 83-2 and 84-1, the worker protection (farmworker safety) statements specified in those Notices must appear on the labeling of all agricultural use products with directions for foliar application to crops whose culture requires hand labor. A 24-hour reentry interval is required in the interim until the required reentry data has been submitted and reviewed.

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*All labeling requirements for lindane smoke fumigation devices for indoor use set forth in the Amendment of Notification of Intent to Cancel (50 FR 5424, February 8, 1985) remain in effect until cancellation of that use becomes effective in May, 1986.

e. Products with directions for use for avocados, pecans, livestock sprays, commercial ornamentals, Christmas trees, forestry, and hardwood logs and lumber must bear the following protective clothing statement:

> "Applicators must wear water resistant hat, lightweight protective suit or coveralls, unlined waterproof gloves (natural rubber, neoprene, or polyethylene), and unlined lightweight boots. Mixer/loaders must wear goggles or a face shield, waterproof apron, and unlined waterproof gloves."

f. Products with directions for use for spraying uninhabited buildings (warehouses, etc.) and/or empty storage bins (including grain bins) must bear the following protective clothing statement:

> "Applicators must wear water resistant hat, lightweight protective suit or coveralls, unlined waterproof gloves (natural rubber, neoprene, or polyethylene), unlined lightweight boots, and an MSHA/OSHA approved respirator. Mixer/loaders must wear goggles or a face shield, waterproof apron, and unlined waterproof gloves."

g. Products with directions for use for structural treatment must bear the following protective clothing statement:

> "Applicators must wear water resistant hat, lightweight protective suit or coveralls, unlined waterproof gloves (natural rubber, neoprene, or polyethylene), and unlined lightweight boots. MSHA/OSHA approved respirators are required for applications in enclosed areas such as crawl spaces. Mixer/loaders must wear goggles or a face shield, waterproof apron, and unlined waterproof gloves."

h. All indoor structural pest control products must include a statement that lindane must not be applied to currently occupied areas (i.e. living or working areas) of the home or other buildings. Characterization of a site as "currently occupied" depends upon the intended function of the area (such as living areas, including finished basements and finished attics, and workplaces) and does not depend upon whether or not there are occupants present at the time of application.

i. Products with directions for use as dog shampoos or dog dips must bear the following protective clothing statement:

> "Applicators must wear long sleeved shirt, long pants, elbow-length waterproof gloves, waterproof apron, and unlined waterproof boots."

j. Products with directions for use as a dog dip must bear the following precaution:

> " Improper dilution of this product could cause serious injury to your dog."

k. Products with directions for use as dog dips for pests other than mites must bear the following statements:

1) The front panel must include the following:

   "AN INDIVIDUAL APPLICATOR MUST NOT APPLY THIS PRODUCT MORE THAN TWELVE TIMES PER YEAR."

2) Beneath the product name on the front panel, and in the same type size as the signal word:

   "FOR KENNEL, COMMERCIAL, FARM AND SPORT DOG USES ONLY"

3) The last two sentences of the directions for use must state:

   "An individual applicator must not use this product more than twelve times per year. Each treatment of three dogs or fewer should be considered one use."

4) The label must include the following statement:

   "Children under the age of thirteen should not be allowed to handle or apply this product."

5) The label must include the following statement:

   "Used dip solutions must be disposed of in accordance with the Resource Conservation and Recovery Act (RCRA). If the applicator generates more than 1000 kg of used dip solution per month or more than 1000 kg used dip solution in combination with other hazardous waste, the material must be treated as a hazardous waste subject to subpart C of RCRA. Any user who wishes to treat, store or dispose of hazardous waste must obtain a permit to serve as a hazardous waste facility pursuant to RCRA."

l. Products with directions for use as a dog dust must bear the following statement:

> "This product must be applied in a well-ventilated area."

m. Products with directions for use for moth sprays must bear the following protective clothing statement:

> "Applicators must wear an MSHA/OSHA approved respirator."

n. Products with directions for use for manual seed treatment must bear the following statements:

> "Applicators must wear long sleeved shirt, long pants, gloves, and a disposable paper dust mask covering at least one third of face. This product must be applied in a well-ventilated area."
>
> > [Note - labeling for products containing lindane in combination with a fungicide which requires use of a respirator should include the MSHA/OSHA respirator statement appropriate to the fungicide instead of the paper dust mask requirement.]

o. All seed treatment products must bear the following wildlife precaution:

> "Exposed treated seed may be hazardous to birds and other wildlife. Dispose of all excess treated seeds by burial away from bodies of water."

p. Registrants should refer to the footnotes of the generic residue chemistry data requirements (pages 180-222 of this Standard) for additional labeling revisions for specific crop/livestock uses.

q. In the absence of field crop rotation data, the crop rotation restriction below must be placed on all products which may be used in a situation where rotation with crops used for food or feed that are not registered with lindane may occur:

> "Do not plant any food or feed crop in rotation after a field treatment with lindane unless it is a registered use for lindane."

r. Recommendations for tank mixes with other pesticides that do not have a tolerance established for the specified crop must not appear on labeling.

s. All products with directions for use on field crops and/or homeowner vegetable gardens must include the following statement:

> "Soil application: Do not make soil application to root crops, which might absorb a musty flavor. Do not apply in soil which will be planted to root crops (except potatoes) within 1 year. Do not use in soil which will be planted to potatoes within 2 years."

t. All indoor-use products must include the following statement:

"Do not apply this product in edible product areas of food processing plants, restaurants, or other areas where food is commercially prepared or processed. Do not use in serving areas while food is exposed."

u. Products with directions for use for homeowner use on ornamentals must bear the following protective clothing statement:

> "Applicators must wear long sleeved shirt, long pants, waterproof gloves, full foot covering (such as shoes or boots), and head covering (such as a hat)."

v. All residential-use products (including shelf paper and sprays) must bear the following statements in the directions for use:

> "Avoid exposure to children. Do not allow children to handle or apply this product."

[NOTE - Lindane products meeting the criteria of 40 CFR 162.16 (Products Requiring Special Packaging) and with concentrations of lindane greater than 6.5% must be in child-resistant packaging.]

w. If the residential-use product is a spray or a liquid, the label must include the additional statement:

> "Do not allow children or pets in treated areas until surfaces are dry."

x. All products with outdoor uses must include following Environmental Hazards statement:

> "This pesticide is toxic to fish, birds, and other wildlife. Do not apply directly to water or wetlands. Drift and runoff from treated areas may be hazardous to fish in neighboring areas. Do not contaminate water by cleaning of equipment or disposal of wastes.
>
> This pesticide is highly toxic to bees exposed to direct application. Applications should be timed to coincide with periods of minimum bee activity, usually between late evening and early morning."

y. Labels with directions for use as a dip for livestock and hardwood logs or lumber must include the following statement:

> "Used dip solutions must be disposed of in accordance with the Resource Conservation and Recovery Act (RCRA). If the applicator generates more than 1000 kg of used dip solution per month or more than 1000 kg used dip solution in combination with other hazardous waste, the material must be treated as a hazardous waste subject to subpart C of RCRA. Any user who wishes to treat, store or dispose of hazardous waste must obtain a permit to serve as a hazardous waste facility pursuant to RCRA."

z. Lindane products are "toxic" hazardous wastes when discarded. The following pesticide disposal statement must appear on all labels (except products intended for household use only):

> "PESTICIDE DISPOSAL: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance."

G. Tolerance Reassessment

There are over 40 registered uses of lindane for food. By far the most significant are seed treatments (48% of all use) and livestock (20% of all use). Other major uses include pecans (3%), pineapples (2%), and cucurbits (1%). Many of the registered uses are not active, i.e. do not appear on any current product label.

Using the conventional method of total maximum residue contribution (TMRC), a 1.4189 mg/day intake can be computed. Because of inadequate analytical methods and incomplete characterization of the nature of the residues in plants and animals, the tolerances are virtually unsupported by residue data meeting current standards. In addition, lack of a good chronic feeding study means that a conventional ADI cannot be established. Additional residue data and a rat chronic feeding study will be required under this Registration Standard to support the existing tolerances.

For the present time, the best available data for determining a provisional acceptable daily intake (PADI) is the new subchronic 90-day feeding study in the rat which was received shortly before the RPAR was completed. This study, which meets core guideline criteria, showed that lindane caused toxic changes primarily in the kidneys but also in the liver of male and female rats. Renal changes were irreversible with a NOEL of 4 ppm in the diet equivalent to 0.3 mg/kg bodyweight/day. Using this latter value, and a safety factor of 1,000 for a subchronic study, the PADI is 0.0003 mg/kg/day and the maximum permissible intake (MPI) for a 60 kg person is 0.018 mg/day. Based upon a TMRC of 1.4189 mg/day/1.5 kg of diet, the percent of the MPI used up is 7,883%. It is this high percentage of MPI used up that is of major concern. Based on the TMRC method of calculation, the estimate of the upper 95% confidence levels of excess cancer risk is $2x10^{-2}$.

Both PD-2/3 and PD-4 used figures derived from FDA Total Diet Composites, rather than the TMRC method of summing the established tolerances, to more accurately reflect actual residues of lindane in foodstuffs. FDA has also concluded that regulatory compliance samples, as well as the Total Diet Composite Samples collected over several years, indicate that dietary intakes of lindane in adults, infants, and toddlers are within acceptable limits. If FDA market basket figures are used, then the average daily consumption of lindane is 0.000002 mg/kg, the percentage of the MPI used up is 0.7%, and the estimate of the upper 95% confidence levels of excess cancer risk is $2x10^{-6}$.

These dietary risk estimates do not reflect the seed treatment uses, since these uses were previously considered non-food uses and no tolerances exist for them. Present Agency policy now categorizes seed treatment as a food use unless a radiolabeled study shows that no residues remain in the edible portion of the specific food crop grown from treated seed. While residues in edible portions are likely to be minimal, any additional tolerances which are required to support the seed treatment uses would further inflate the percent of the MPI being used.

Selectively adjusting the TMRC to reflect percent of crop treated would reduce the percent of MPI used, since many of the tolerances are not being used at all and others (such as the livestock uses) are not used on all animals. Further reductions would occur if tolerances were lowered to reflect actual residues.

The Agency believes that Special Review is not warranted at this time in regard to dietary risk, considering the fact that crop residue data are lacking, and plant and animal metabolism information to characterize the parent compound and metabolites is missing. Also, an adequate chronic feeding study to assess the actual NOEL for dietary exposure is missing. A decision as to whether further regulatory action is necessary will be deferred until all the toxicology and residue data needed to conduct a complete tolerance reassessment are submitted and reviewed. The missing data to do a tolerance reassessment will receive high priority for review upon receipt.

SUMMARY OF PRESENT TOLERANCES

Commodity	Tolerances (part per million)			
	United States	Canada	Mexico	International (Codex)
Apples	1.0	3.0	1.0	0.5
Apricots	1.0	3.0	-	-
Asparagus	1.0	3.0	1.0	-
Avocados	1.0	3.0	1.0	-
Broccoli	1.0	3.0	1.0	-
Brussels Sprouts	1.0	3.0	-	0.5
Cabbage	1.0	3.0	1.0	0.5
Cattle, fat	7.0	2.0	-	2.0
Cauliflower	1.0	3.0	-	0.5
Celery	1.0	3.0	1.0	-
Cherries	1.0	3.0	-	0.5
Collards	1.0	3.0	-	-
Cucumbers	3.0	3.0	3.0	-
Eggplant	1.0	3.0	1.0	-
Goats, fat	7.0	2.0	-	-
Grapes	1.0	3.0	1.0	0.5
Guavas	1.0	3.0	1.0	-
Hogs, fat	4.0	2.0	-	2.0
Horses, fat	7.0	-	-	-
Kale	1.0	3.0	-	-
Kohlrabi	1.0	3.0	-	1.0
Lettuce	3.0	3.0	3.0	2.0
Mangoes	1.0	3.0	1.0	-
Melons	3.0	3.0	3.0	-
Mushrooms	3.0	3.0	-	-
Mustard Greens	1.0	3.0	-	-
Nectarines	1.0	-	-	-
Okra	1.0	3.0	1.0	-
Onions, dry bulb only	1.0	3.0	1.0	-
Peaches	1.0	3.0	1.0	-
Pears	1.0	3.0	1.0	0.5
Pecans	0.01	-	0.01	-
Peppers	1.0	3.0	1.0	-
Pineapples	1.0	3.0	1.0	-
Plums, incl. Prunes	1.0	3.0	-	0.5
Pumpkins	3.0	3.0	-	-
Quinces	1.0	3.0	-	-
Sheep, fat	7.0	2.0	-	2.0
Spinach	1.0	3.0	1.0	2.0
Squash	3.0	3.0	3.0	-
Summer Squash	3.0	3.0	3.0	-
Strawberries	1.0	3.0	1.0	3.0
Swiss Chard	1.0	3.0	-	-
Tomatoes	3.0	3.0	3.0	2.0

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c009001 LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)*

TYPE PESTICIDE: Insecticide, Acaricide

FORMULATIONS:

Tech	(99%, 99.5%, 100%)
FI	(10%, 20%, 25%, 95%)
D	(0.5%, 0.75%, 1%, 12.5%, 16.6%, 18.75%, 25%, 75%)
WP	(3%, 6%, 9%, 10%, 25%, 75%)
WP/D	(0.5%, 1%, 25%, 75%)
Impr	(0.27%, 2.3%, 5.6%, 11.2%)
EC	(0.35 lb/gal, 0.36 lb/gal, 1 lb/gal, 1.6 lb/gal, 1.63 lb/gal, 1.65 lb/gal, 1.66 lb/gal, 1.7 lb/gal, 1.75 lb/gal, 0.45%, 0.5%, 1%, 1.68%, 1.96%, 2%, 2.5%, 3.9%, 4.25%, 4.6%, 5%, 6.5%, 6.63%, 8.82%, 10%, 10.68%, 10.94%, 11%, 11.14%, 11.34%, 11.37%, 12.2%, 12.29%, 12.5%, 12.8%, 12.89%, 17%, 20%, 25%, 40%)
FlC	(1%, 30%, 40%)
SC/L	(1.63 lb/gal, 20%)
RTU	(2.67 lb/gal, 4 lb/gal, 0.05%, 0.097%, 0.1%, 0.2%, 0.25%, 0.3%, 0.5%, 1%, 2%, 3%, 5%, 8.6%, 10.5%, 14.6%, 25%)
PrL	(0.25%, 0.75%, 3%)

GENERAL WARNINGS AND LIMITATIONS: Lindane products registered for the following uses are classified for restricted use: commercial ornamentals, pecans, livestock (spray), forestry, Christmas trees, structural treatments, dog shampoos, and dog dusts. Labels claiming such uses must contain the following language: RESTRICTED USE PESTICIDE. For application only by or under the direct supervision of a certified applicator. Applicators must wear the following protective clothing during the application process: a lightweight protective suit or coveralls; water-resistant hat; unlined, waterproof gloves; and unlined, lightweight boots. Mixers and loaders must also wear goggles or a face shield, waterproof gloves and a waterproof apron. In addition to the above protective clothing requirements, some specific uses require explicit warning:

a) For dog dust use, lindane should be applied in a well-ventilated area.
b) For structural treatment, applicators working in enclosed areas such as crawl spaces, must wear a respirator approved by Occupational Safety and Health Administration (29 CFR 1910.134).
c) For dog shampoos, applicators must wear the following protective clothing during the application process: waterproof, elbow-length gloves; a waterproof apron; and unlined, waterproof boots.

For homeowner ornamentals, applicators must wear: long-sleeved shirt, long pants, waterproof gloves, full foot covering, and a head covering.

For hardwood logs and lumber, applicators must wear: lightweight protective suit or coveralls; unlined, waterproof gloves; and unlined, lightweight boots.

For dog dips, applicators must wear: elbow-length, waterproof gloves; a waterproof apron; and unlined, waterproof boots. Improper dilution could cause injury to pets. Children should not be allowed to handle or apply this product.

For moth sprays, applicators must wear MSHA/OSHA-approved cartridge respirators.

*lindane

GENERAL WARNINGS AND LIMITATIONS (continued)

For seed treatment, applicators who apply this product manually or without the use of a closed-system treatment procedure must wear: long-sleeved shirt; long pants; gloves; and a disposable, paper dust mask which covers at least one-third of the face. The product must be applied in a well-ventilated area.

For other household uses (shelf paper and household sprays), do not allow children to handle or apply this product. Children and pets should not be allowed in treated areas until sprayed surfaces are dry.

Aerial application of lindane is prohibited.

Any lindane products registered for residential use (dog dips, household products) that contain more than 6.5 percent active ingredient must comply with EPA's child resistant packaging regulations set forth in 40 CFR 162.61 and 46 CFR 15104.

Bee Caution:

Lindane is highly toxic to bees exposed to direct treatment or to residues remaining in the treated area. Do not apply when bees are actively visiting in the treatment area. Applications should be timed to provide the maximum possible interval between treatment and the next period of bee activity.

Agricultural Crop Tolerances (other than those listed in the text):

Avocados - 1 ppm
Guavas - 1 ppm
Kohlrabi - 1 ppm
Mangoes - 1 ppm
Mushrooms - 3 ppm
Mustard Greens - 1 ppm
Nectarine - 1 ppm
Quinces - 1 ppm
Swiss Chard - 1 ppm

Definition of Terms:

MAI - Multiple active ingredient(s)

* Tablespoons actual: A hypothetical quantity computed by multiplying the number (or equivalent number) of tablespoons of product by the concentration of lindane in the formulation.

**Computed from tablespoons/teaspoons dosage.

# Exact computation of actual dosage is not possible because of the lack of weight/volume information on the label. Extrapolation from other formulations reveals that the dosage from this label appears to fall within the range shown by formulations with known weight/volume ratios.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations

TERRESTRIAL FOOD CROP

(Agricultural Crops)

General Warnings and Limitations: Apply when pests first appear in threatening numbers and repeat at regular day intervals or as needed, unless otherwise specified. Consult your State Agricultural Extension Service for additional information on compatibility, dosage, timing, and uses. Do not plant any food or feed crop in rotation after a field treatment with lindane unless it is a registered use for lindane.
Soil Application: Do not make soil application to root crops which might absorb a musty flavor. Do not apply in soil which will be planted to root crops (except potatoes) within 1 year. Do not use in soil which will be planted to potatoes within 2 years.
Seed Treatment: Do not use treated seed for food, feed, or oil purposes. Treated seed should be labelled in accord with all the applicable requirements of the Federal Seed Act. The Federal Seed Act requires that seed treated with a pesticide must contain a dye which imparts an unnatural color to the seed if the seed is intended to be moved in interstate commerce. Exposed treated seed may be hazardous to birds and other wildlife. Dispose of excess seed by burial away from bodies of water.
Only seed of high germination with good vigor should be treated with lindane. Poor seed may suffer greater injury. Treat seed not over 6 weeks before planting. Store treated seed in a dry place until planted so that excess moisture will evaporate. If seed is stacked when wet, heat may develop which could impair germination.
The common methods of treating seed are slurry, planter box, and dry method. For slurry treatment, apply in a slurry-type treater specifically designed and approved for that purpose or apply by hand in any suitable mixing equipment, such as home-made rotary drums. For planter box method, fill the box only half full of seed and half the required amount of lindane and mix thoroughly with a stick. Then add the remainder of the seed to the box and add the rest of the required amount of lindane to the seed, again mixing thoroughly. For dry treatment, mix product with the seed in any commercial or barrel treater, until thoroughly coated. Certain wettable powders may be applied dry. Wettable powder/dusts may be applied as a slurry, dry, or in the planter box. Dosage rates are given in ounces of active ingredient per 100 pounds of seed except for those given in ounces per bushel or those otherwise specified.
Labels claiming control of seed-infesting insects using slurry or dry method may be tank mixed with one or a combination of: hexachlorobenzene; thiram; captan; or carboxin.
Labels claiming control of seed-infesting insects using planter box method may be formulated with one or a combination of: maneb; diazinon; captan; or carboxin.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/23001AA	Alfalfa		No tolerance established. Seed treatment through 0.5 ounce per 100 pounds of seed.
/23003AA	Clover		
INAKABA	Seedcorn beetle	0.5 oz/100 lb/seed (25% D) (25%, 75% WP) (25%, 75% WP/D) or 2 fl.oz 25% EC, RTU/100 lb/seed (25% EC) (25% RTU) or 1.33-2 fl.oz 30% FlC/100 lb seed (30% FlC) or 1-1.33 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry, planter box, or dry method. For slurry method, apply 1 pint of liquid slurry per 100 pounds of seed.
IOACAHA	Seedcorn maggot		
INBPAAA	White grubs		
INAVAAA	Wireworms		
/04001AA	Apple		1 ppm 60 day preharvest interval through 0.65 pound per acre of dust formulation or 3.6 pounds of spray formulations per acre for foliar application. Do not apply after first cover as off flavor may result. For emulsifiable concentrate formulations, apply a minimum of 300 gallons of water per acre.
IRACAAA	Aphids (including rosy apple aphid)	0.35-0.65 lb/A (1% D) or 0.25 lb/100 gal or 0.75-1 lb/A (25% WP) or	Foliar application. For rosy apple aphid, apply as late as petal fall.
INAMADA	Flea beetles		
IVABAAA	Grasshoppers		
IQAMARA	Lygus bugs		
INASAVA	Plum curculio		
IMOAAAA	Thrips		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Apple (continued)		
		0.02 oz**/gal or 0.3 lb/100 gal (1.6 lb/gal EC) (20% EC)# or 0.5 pt 40% EC/100 gal (40% EC) or 0.67 pt 30%, 40% FlC/100 gal (30%, 40% FlC)	
INAHALA ITBQAHA INALBNA INBQBQA	Flatheaded appletree borer Peachtree borer Roundheaded appletree borer Shothole borer	0.25 lb/100 gal (25% WP) or 0.03-0.13 oz/gal** or 0.61-0.63 lb/100 gal (1, 1.63, 1.65 lb/gal EC) (12.5%, 12.8%, 20% EC)# or 4-4.5 tbls 5% EC/gal or 1.5 gal 5% EC/100 gal (5% EC) or 2 tbls 10% EC/gal or 6 pt 10% EC/100 gal (10% EC) or	Bark application. Apply to trunk and lower branches from crotch to ground. Soak bark to the point of runoff. First application should be made between July 10 and 15 followed by 2 subsequent applications at 21 to 28 day intervals. For liquid ready-to-use formulation, pour product into a sprayer bottle that can be adjusted to deliver a pin point stream. Inject into feeding entry hole. For roundheaded appletree borer, apply at the beginning of the larval stage or during the pupal stage at both of which times the pests are located just under the bark. Consult your State Agricultural Extension Service to determine the life cycle of the borer to be controlled. For flatheaded appletree borer, apply as soon as symptoms are first observed. The symptoms can include a damp spot on the bark at the point of early infestation, developing until the sap drips from the spot; discoloration of bark overlying the tunnel; and the possible appearance of dry feces at the entrance to or just below the tunnels. If the

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Apple (continued)		
		-- (1% RTU)	treated areas have not dried within 7 to 10 days, treatment should be repeated.
/05001AA	Apricot		1 ppm 60 day preharvest interval through 0.62 pound per 100 gallons of water for bark application.
ITBQAHA	Peachtree borer	0.1 oz**/gal or 0.62 lb/100 gal (20% EC)#	Bark application. Apply to trunk and lower branches from crotch to ground. Do not apply to fruit or foliage. Apply in late spring or early summer.
/16002AA	Asparagus		1 ppm Seedling and postcutting stage application through 0.5 pound per acre.
INAMBDA IMOAAAA	Asparagus beetle Thrips	0.35-0.5 lb/A (1% D)	Seedling and postcutting stage application. Dust thoroughly.
/28063AA	Barley		No tolerance established. Seed treatment through 1 ounce per 100 pounds of seed for slurry and dry methods or 2 ounces per bushel of seed for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	1 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.35-4 fl.oz 30% FlC/100 lb seed (30% FlC) or	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Barley (continued)		
		1-3 fl.oz 40% FlC/100 lb seed (40% FlC)	
		2 oz/bu (25% WP/D)	Seed treatment. Apply by planter box method.
		--OR MAI--	
		0.81-1 oz/100 lb seed (12.5%, 25% D) or 0.375 oz/bu (18.75% D) or 3 fl.oz 8.6%, 10.5% RTU/bu (8.6%, 10.5% RTU)	
		1 oz/100 lb seed (75% WP) (75% WP/D)	Seed treatment. Apply by dry method.
/28001AA	**Beans**		No tolerance established. Seed treatment through 1 ounce per 100 pounds of seed for slurry and dry methods or 2 ounces per bushel of seed for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.5-1 oz/100 lb seed (25%, 75% WP) (75% WP/D) (4 lb/gal RTU) or 2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Beans (continued)		
		0.7-2.67 fl.oz 30% F1C/100 lb seed (30% F1C) or 0.5-2 fl.oz 40% F1C/100 lb seed (40% F1C)	
		2 oz/bu (25% WP/D)	Seed treatment. Apply by planter box method.
		--OR MAI--	
		0.5 oz/100 lb seed (12.5%, 25% D) or 0.42-0.58 oz/bu (16.6% D)	
		0.5-1 oz/100 lb seed (75% WP)	Seed treatment. Apply by dry method.
/15002AA	Beans, Succulent		No tolerance established. Seed treatment through 0.5 ounce per 100 pounds of seed.
INAKABA	Seedcorn beetle	0.25-0.5 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 1 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
IOACAHA	Seedcorn maggot		
INBPAAA	White grubs		
INAVAAA	Wireworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Beans, Succulent (continued)		
		0.75-1.5 fl.oz 40% FlC/100 lb seed (40% FlC)	
		0.25 oz/100 lb seed (25% D)	Seed treatment. Apply by planter box method.
		0.25-0.5 oz/100 lb seed (25% WP) (75% WP/D)	Seed treatment. Apply by dry method.
/28002AA	Beets		No tolerance established. Seed treatment through 4 ounces per 100 pounds of seed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	10.8 fl.oz 30% FlC/100 lb seed (30% FlC) or 8 fl.oz 40% FlC/100 lb seed (40% FlC) or 4 oz/100 lb seed (2.67, 4 lb/gal RTU)	Seed treatment. Apply by slurry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/13005AA	Broccoli		1 ppm Do not apply after edible parts start to form through 0.75 pound per acre for foliar application. Soil application through 1 pound per acre. Seed treatment through 1.8 ounces per 100 pounds of seed. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.
/13006AA	Brussels Sprouts		
/13007AA	Cabbage		
/13008AA	Cauliflower		
IRACAAA ITBCCSA ITBCCZA INAMADA ITBJAHA IMAAAGA IQAQAAA ITBJAGA IMOAAAA	Aphids Cabbage looper Climbing cutworms Flea beetles Imported cabbage worm Leafminers (including serpentine leafminer) Plant bugs Southern cabbageworm Thrips	0.1-0.4 lb/A (1% D) or 0.04 oz**/gal or 0.25 tsp actual*/gal or 0.2-0.75 lb/A (6%, 25% WP) or 0.03 oz**/gal or 0.31-0.43 lb/A (0.36, 1.65, 1.7 lb/gal EC)	Foliar application.
IOACADA	Cabbage maggot	1 lb/A (25% WP)	Soil application. Apply to soil around base of plants.
ITBCABA INAMBIC INBPAAA INAVAAA	Cutworms Diabrotica beetles (larvae) White grubs Wireworms	0.25-0.5 lb/A (25% WP)	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.5 oz/100 lb seed (75% WP) or 2 fl.oz 25% EC/100 lb seed (25% EC) or	Seed treatment. Apply by slurry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Broccoli (continued)		
		1.33-4.9 fl.oz 30% FlC/100 lb seed (30% FlC) or 1-3.6 fl.oz 40% FlC/100 lb seed (40% FlC) or 1.8 oz/100 lb seed (2.67, 4 lb/gal RTU)	
		0.5 oz/100 lb seed (25% D)	Seed treatment. Apply by planter box method.
/28073AA	**Carrots**		No tolerance established. Seed treatment through 1 ounce per 100 pounds of seed.
INAKABA	Seedcorn beetle	1 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-4.9 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 1.3 pints of liquid slurry per 100 pounds of seed.
IOACAHA	Seedcorn maggot		
INBPAAA	White grubs		
INAVAAA	Wireworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Carrots (continued)		
		1 oz/100 lb seed (75% WP) (25%, 75% WP/D)	Seed treatment. May be applied by planter box or dry method.
	Cauliflower		See Broccoli cluster.
/28003AA	**Celery**		1 ppm Do not apply after plants are half grown or begin to bunch through 0.75 pound per acre for foliar application. Preplant soil application through 2.06 pounds per acre. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.
IRACAAA	Aphids	0.1-0.4 lb/A (1% D) or 0.25 tsp actual*/gal or 0.3-0.75 lb/A (25% WP) or 0.32-0.4 lb/A (1.65, 1.7 lb/gal EC)	Foliar application.
ITAAAAA	Caterpillars (including climbing cutworm)		
ITBMCQC	Celery leaftier (larvae)		
ITBCARC	Celery looper (larvae)		
INAMACA	Cucumber beetles		
ITBMCPA	False celery leaftier		
INAMADA	Flea beetles		
IMAAAGA	Leafminers		
ITBHAFA	Parsleyworm		
IQAMATA	Tarnished plant bug		
IMOAAAA	Thrips		
ITBCABA	Cutworms	0.25-1 lb/A (6%, 25% WP) or 0.41-0.52 lb/A (1.65 lb/gal EC) or 0.31 lb/100 gal (10.68% EC)#	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil. For garden symphylan, apply the higher dosage for heavy infestation.
INAMBIC	Diabrotica beetles (larvae)		
INBPAAA	White grubs		
INAVAAA	Wireworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Celery (continued)		
IJDAABA	Garden symphylan	1.24-2.06 lb/A (1.65 lb/gal EC)	
/05002AA	Cherry		1 ppm Do not apply to foliage or fruit after fruit starts to form through 1 pound per acre.
IRACAAA	Aphids	0.3 lb/100 gal (1.6 lb/gal EC) or 0.03 oz**/gal (20% EC)# or 0.25 pt 40% EC/100 gal (40% EC) or 0.33 pt 30%, 40% FlC/100 gal (30%, 40% FlC)	Foliar application.
INAMADA	Flea beetles	0.03 oz**/gal (20% EC)#	
INASAVA	Plum curculio		
IMOAAAA	Thrips		
INAHALA	Flatheaded apple-tree borer	0.06-0.1 oz**/gal or 0.61-0.63 lb/100 gal (1.63, 1.65 lb/gal EC) (12.8%, 20% EC)# or 4-4.5 tbls 5% EC/gal (5% EC) or	Bark application. Apply to trunk and lower branches from crotch to ground. Soak bark to the point of runoff. First application should be made between July 10 and 15 followed by 2 subsequent applications at 21 to 28 day intervals.
ITBQAHA	Peachtree borer		
INALBNA	Roundheaded apple-tree borer		
INBQBQA	Shothole borer		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Cherry (continued)		
		1.5 gal 5% EC/100 gal (5% EC) or 2 tbls 10% EC/gal or 6 pt 10% EC/100 gal (10% EC)	
	Clover		See Alfalfa cluster.
/13009AA	**Collards**		1 ppm Do not apply after edible parts start to form through 0.48 pound per acre for foliar application. Preplant soil application through 1 pound per acre. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.
IRACAAA	Aphids	0.24 lb/100 gal or 0.48 lb/A (6% WP) or 0.21 lb/100 gal or 0.32 lb/A (1.65 lb/gal EC)	Foliar application.
ITBCCSA	Cabbage looper		
ITBCCZA	Climbing cutworms		
INAMADA	Flea beetles		
ITBJAHA	Imported cabbageworm		
IMAAAGA	Leafminers (including serpentine leafminer)		
IQAQAAA	Plant bugs		
ITBJAGA	Southern cabbageworm		
IMOAAAA	Thrips		
ITBCABA	Cutworms	0.5 lb/100 gal or 1 lb/A (6% WP) or 0.31 lb/100 gal (10.68% EC)#	Preplant soil application. Work into soil thoroughly during or before planting.
INBPAAA	White grubs		
INAVAAA	Wireworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28006EA	Corn		No tolerance established. Seed treatment through 2 ounces per 100 pounds or per bushel of seed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	1-2 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 3.33-6.67 fl.oz 30% FlC/100 lb seed (30% FlC) or 2.5-5 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
		1-2 oz/100 lb seed (25% D) (25% WP) (75% WP/D) or 1-2 oz/bu (12.5%, 25% D) (25% WP) (25% WP/D) --OR MAI-- 0.42-1 oz/bu (12.5%, 16.6%, 18.75% D) or	Seed treatment. Apply by planter box method.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Corn (continued)		
		4 fl.oz 8.6% RTU/bu (8.6% RTU) or 5.5 fl.oz 10.5% RTU/bu (10.5% RTU)	
		2 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method.
/28007AA	Cotton		No tolerance established. Seed treatment through 2.25 ounces per 100 pounds of seed.
INAKABA	Seedcorn beetle	1-2 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 6.4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 5-6.67 fl.oz 30% FlC/100 lb seed (30% FlC) or 3.75-5 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method to delinted, refined and acid cottonseed. Apply 1 pint of liquid slurry per 100 pounds of seed.
IOACAHA	Seedcorn maggot		
INBPAAA	White grubs		
INAVAAA	Wireworms		
		2.25 oz/100 lb seed (25% WP) (75% WP/D) (4 lb/gal FlC) or	Seed treatment. Apply by slurry method to fuzzy, undelinted cottonseed. Apply 1 pint of liquid slurry per 100 pounds of seed.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
Cotton (continued)		
	7.2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 6-8 fl.oz 30% FlC/100 lb seed (30% FlC) or 4-6 fl.oz 40% FlC/100 lb seed (40% FlC)	
	2 oz/100 lb seed or 2 oz/bu (25% WP/D)	Seed treatment. Apply by planter box method to delinted, refined and acid-treated cottonseed.
	2.25 oz/100 lb seed (25% D)	Seed treatment. Apply by planter box method to fuzzy, undelinted cottonseed.
	2 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method to delinted, refined and acid-treated cottonseed.
	2.25 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method to fuzzy, undelinted cottonseed.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/10010AA /10001AA /10011AA /10012AA	Cucumber		3 ppm 1 day preharvest interval through 0.63 pound per acre. Preplant soil application through 2.06 pounds per acre. Seed treatment through 1.8 ounces per 100 pounds of seed. Do not apply after blossoms open. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.
IRACAAA ITBCCZA INAMACA IVABAAA IMAAAGA IQAMARA ITBMAUA ITBMAWA IQAQAAA IQAGAFA ITBQADA IMOAAAA	Aphids Climbing cutworms Cucumber beetles (including spotted cucumber beetle and striped cucumber beetle) Grasshoppers Leafminers Lygus bugs Melonworm Pickleworm Plant bugs Squash bug Squash vine borer Thrips	0.1-0.5 lb/A (0.75%, 1% D) or 0.25 tsp actual*/gal or 0.2-0.63 lb/A (10%, 25% WP) or 0.25 tbls actual*/gal (25% WP/D) or 0.03 oz**/gal or 0.2-0.41 lb/A (0.36, 1.6 lb/gal EC)	Foliar application. Apply when plants first break through the ground or when plants are about 1 inch in height. Repeat as needed. For cucumber beetles and thrips, apply the lower dosage of the range. For melonworm and pickleworm, apply when worms are first seen in the blossoms and repeat at 7 day intervals or as needed. For squash vine borer, thoroughly cover stems and vines at the base of plants. Dust formulations may be formulated with maneb.
ITBCABA INAMBIC INBPAAA INAVAAA	Cutworms Diabrotica beetles (larvae) White grubs Wireworms	0.25-1 lb/A (6%, 25% WP) or 0.41-0.52 lb/A (1.65 lb/gal EC) or 0.31 lb/100 gal (10.68% EC)#	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil. For garden symphylan, apply the higher dosage for heavy infestation.
IJDAABA	Garden symphylan	1.24-2.06 lb/A (1.65 lb/gal EC)	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Cucumber (continued)		
INAKABA	Seedcorn beetle	1 oz/100 lb seed (25%, 75% WP) (75% WP/D) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-4.9 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3.6 fl.oz 40% FlC/100 lb seed (40% FlC) or 1.8 oz/100 lb seed (2.67, 4 lb/gal RTU)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
IOACAHA	Seedcorn maggot		
INBPAAA	White grubs		
INAVAAA	Wireworms		
		1 oz/100 lb seed (25% D) (75% WP) (25%, 75% WP/D)	Seed treatment. May be applied by planter box or dry method.
/11001AA	Eggplant		1 ppm Do not apply after edible parts start to form through 0.45 pound per acre.
IRACAAA	Aphids	0.1-0.45 lb/A (1% D) or 0.03 oz**/gal (0.36 lb/gal EC) or	Foliar application.
ITBCCZA	Climbing cutworms		
INAMADA	Flea beetles		
IQAXAAA	Lace bugs		
IMAAAGA	Leafminers		
IQAQAAA	Plant bugs		
IQAGAFA	Squash bug		
ITBQADA	Squash vine borer		
IMOAAAA	Thrips		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Eggplant (continued)		
		0.43 lb/A (1.7 lb/gal EC)	
/28009AA	Flax		No tolerance established. Seed treatment through 2 ounces per 100 pounds of seed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	1.5 oz/100 lb seed (75% WP) or 2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.33-2 fl.oz 30% F1C/100 lb seed (30% F1C) or 1-1.5 fl.oz 40% F1C/100 lb seed (40% F1C)	Seed treatment. Apply by slurry method.
		2 oz/100 lb seed (25% WP/D)	Seed treatment. Apply by planter box method.
		--OR MAI--	
		0.5 oz/100 lb seed (25% D) or 0.75 oz/bu (18.75% D) or 8 fl.oz 10.5% RTU/bu (10.5% RTU)	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/01014AA	Grapes		1 ppm Do not apply later than 1 month after bloom through 1 quart of 40 percent emulsifiable concentrate formulation; and 30 and 40 percent of flowable concentrate formulation per acre.
IRAVAJA	Grape phylloxera	1 qt 40% EC, 30% and 40% FlC/A (40% EC) (30%, 40% FlC)	Foliar application. Apply in sufficient water for thorough coverage.
/13001AA	Kale		1 ppm Do not apply after edible parts start to form through 0.43 pound per acre for foliar application. Preplant soil application through 2.06 pounds per acre.
IRACAAA	Aphids	0.41-0.43 lb/A (1.65, 1.7 lb/gal EC)	Foliar application.
ITBCCSA	Cabbage looper		
ITBCCZA	Climbing cutworms		
INAMADA	Flea beetles		
ITBJAHA	Imported cabbageworm		
IMAAAGA	Leafminers (including serpentine leafminer)		
IQAQAAA	Plant bugs		
ITBJAGA	Southern cabbageworm		
IMOAAAA	Thrips		
ITBCABA	Cutworms	0.25-0.5 lb/A (25% WP) or 0.41-0.52 lb/A (1.65/gal EC)	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil. For garden symphylan, apply the higher dosage for heavy infestation.
INAMBIC	Diabrotica beetles (larvae)		
INBPAAA	White grubs		
INAVAAA	Wireworms		
IJDAABA	Garden symphylan	1.24-2.06 lb/A (1.65 lb/gal EC)	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/15011AA	Lentils		No tolerance established. Seed treatment through 1 ounce per 100 pounds of seed.
INAKABA	Seedcorn beetle	0.94-1 oz/100 lb seed (75% WP) (2.67, 4 lb/gal RTU) or 3.2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.7-3.33 fl.oz 30% FlC/100 lb seed (30% FlC) or 1.75-2.5 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method.
IOACAHA	Seedcorn maggot		
INBPAAA	White grubs		
INAVAAA	Wireworms		
		0.94 oz/100 lb seed (75% WP)	Seed treatment. Apply by dry method.
/13020AA	Lettuce		3 ppm Do not apply to leaf lettuce after seedling stage or to head lettuce after the heads begin to form through 0.43 pound per acre. Preplant soil application through 2.06 pounds per acre. Seed treatment through 1 ounce per 100 pounds of seed.
IRACAAA	Aphids	0.3-0.4 lb/A (1% D) or 2 tbls actual*/gal (25% WP/D) or	Foliar application.
ITBCABA	Cutworms		
INAMADA	Flea beetles		
IMAAAGA	Leafminers		
IMOAAAA	Thrips		
ITAAAMA	Webworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Lettuce (continued)		
		0.43 lb/A (1.7 lb/gal EC)	
ITBCABA INAMBIC INBPAAA INAVAAA	Cutworms Diabrotica beetles (larvae) White grubs Wireworms	0.25-1 lb/A (6%, 25% WP) or 0.41-0.52 lb/A (1.65 lb/gal EC) or 0.31 lb/100 gal (10.68% EC)#	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distrubtion in upper 4 to 6 inches of soil. For garden symphylan, apply the higher dosage for heavy infestation.
IJDAABA	Garden symphylan	1.24-2.06 lb/A (1.65 lb/gal EC)	
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	1 oz/100 lb seed (25%, 75% WP) (75% WP/D) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-3.33 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-2.5 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 1.3 pints of liquid slurry per 100 pounds of seed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Lettuce (continued)		
		1 oz/100 lb seed (25% D) (75% WP) (25%, 75% WP/D)	Seed treatment. May be applied by planter box or dry method.
/10001AA	Melons (including Cantaloupe and Watermelon)		3 ppm Do not apply after blossoms open through 0.5 pound per acre for foliar application. Preplant soil application through 2.06 pounds per acre. Seed treatment through 1.8 ounces per 100 pounds of seed. Late foliar treatment may result in reduction of quality at harvest. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.
ITBCABA INAMBIC INBPAAA INAVAAA	Cutworms Diabrotica beetles (larvae) White grubs Wireworms	0.03-0.04 oz**/gal [0.8 gal/100 sq.ft] (12.5%, 20% EC)#	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil.
		Refer to Cucumber for additional information.	
/28062AA	Oats		No tolerance established. Seed treatment through 0.5 ounce per 100 pounds of seed for slurry and dry methods or 2 ounces per bushel of seed for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.5 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
Oats (continued)		
	1.6 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.33-2 fl.oz 30% F1C/100 lb seed (30% F1C) or 1-1.5 fl.oz 40% F1C/100 lb seed (40% F1C)	
	2 oz/bu (25% WP/D)	Seed treatment. Apply by planter box method.
	--OR MAI--	
	0.5-0.81 oz/100 lb seed (12.5%, 25% D) or 0.375 oz/bu (18.75% D) or 3 fl.oz 8.6%, 10.5% RTU/bu (8.6%, 10.5% RTU)	
	0.5 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/15015AA	Okra		1 ppm Preplant soil application through 1 pound per acre. Seed treatment through 1 ounce per 100 pounds of seed.
ITBCABA INBPAAA INAVAAA	Cutworms White grubs Wireworms	0.5 lb/100 gal or 1 lb/A (6% WP) or 0.3 lb/100 gal (10.68% EC)# or 0.03-0.04 oz**/gal [0.8 gal/ 100 sq.ft] (12.5%, 20% EC)#	Preplant soil application. Work into soil thoroughly during or before planting.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	1 oz/100 lb seed (25%, 75% WP) (75% WP/D) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-4 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
		1 oz/100 lb seed (25% D) (25%, 75% WP/D)	Seed treatment. May be applied by planter box or dry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/14011AA	Onion, Dry		1 ppm (dry bulb only) Foliar application through 0.85 pound per acre. Soil application through 1 pound per acre. Seed treatment through 1 ounce per 100 pounds of seed. For wettable powder formulations, apply in 100 to 200 gallons of water per acre.
IOACACA	Onion maggot	1 lb/A (25% WP)	Soil application. Apply as a preplant or at planting time treatment, or when plants are 2 to 3 inches tall.
IMOAAAA	Thrips	0.1-0.65 lb/A (1% D) or 0.25-0.5 lb/A (25% WP) or 0.85 lb/A (1.7 lb/gal EC)	Foliar application. Apply when pest count average 5 to 6 per plant. Repeat in 5 to 6 days. A third application may be needed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.75-1 oz/100 lb seed (25%, 75% WP) (2.67, 4 lb/gal RTU) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-4 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Onion, Dry (continued)		
		1 oz/100 lb seed (25% D) (25% WP/D)	Seed treatment. Apply by planter box method.
/05004AA	**Peach**		1 ppm 60 day preharvest interval through 0.65 pound per acre for foliar application or through 0.63 pound per 100 gallons of water for bark application. Do not apply later than 7 days after shuck split.
IRACAAA	Aphids	0.35-0.65 lb/A (1% D) or 0.24-0.31 lb/100 gal (6% WP) (10.68% EC)# or 0.03 oz**/gal (20% EC)#	Foliar application.
IMAAAEA	Leafrollers		
INASAVA	Plum curculio		
IMOAAAA	Thrips		
INAHALA	Flatheaded appletree borer	0.03-0.1 oz**/gal or 0.61-0.63 lb/100 gal (1.63, 1.65 EC) (12.5%, 12.8%, 20% EC)# or 4-4.5 tbls 5% EC/gal or 1.5 gal 5% EC/100 gal (5% EC) or 2 tbls 10% EC/gal (10% EC) or	Bark application. Apply to trunk and lower branches from crotch to ground. Soak bark to the point of runoff. First application should be made between July 10 and 15 followed by 2 subsequent applications at 21 to 28 day intervals.
ITBQAHA	Peachtree borer		
INALBNA	Roundheaded appletree borer		
INBQBQA	Shothole borer		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Peach (continued)		
		6 pt 10% EC/ 100 gal (10% EC)	
/04003AA	Pear		1 ppm 60 day preharvest interval through 0.65 pound per acre.
IRACAAA	Aphids	0.5 pt 40% EC/100 gal (40% EC) or 0.67 pt 30%, 40% F1C/100 gal (30% F1C) (40% F1C)	Foliar application.
INAMADA	Flea beetles	0.03 oz**/gal (20% EC)#	
INASAVA	Plum curculio		
IMOAAAA	Thrips		
IRAXALA	Pear psylla	0.35-0.65 lb/A (1% D)	
INAHALA	Flatheaded appletree borer	-- (1% RTU)	Bark application. Apply to trunk and lower branches from crotch to ground. Soak bark to the point of runoff. First application should be made between July 10 and 15 followed by 2 subsequent applications at 21 to 28 day intervals. Pour product into a sprayer bottle that can be adjusted to deliver a pin point stream. Inject into feeding entry hole. For roundheaded appletree borer, apply at the beginning of the larval stage or during the pupal stage at both of which times the pests are located just under the bark. Consult your State Agricultural Extension Service to determine the life cycle of the borer to be controlled. For flatheaded appletree borer, apply as soon as symptoms are first observed.
INALBNA	Roundheaded appletree borer		

	Site and Pest	Dosages and Formulacion(s)	Tolerance, Use, Limitations
	Pear (continued)		
			The symptoms can include a damp spot on the bark at the point of early infestation, developing until the sap drips from the spot; discoloration of bark overlying the tunnel; and the possible appearance of dry feces at the entrance to or just below the tunnels. If the treated areas have not dried within 7 to 10 days, treatment should be repeated.
/28016AA	Peas (including Cowpeas)		No tolerance established. Seed treatment through 1 ounce per 100 pounds of seed for slurry and dry methods or 2 ounces per bushel of seed for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.75-1 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 3.2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-3.33 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
		2 oz/bu (25% D) (25% WP/D)	Seed treatment. Apply by planter box method.
		--OR MAI--	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Peas (continued)		
		0.42-0.58 oz/bu (16.6% D) or 1 oz/100 lb seed (25% D)	
		1 oz/100 lb seed (75% WP) (75% WP/D)	Seed treatment. Apply by dry method.
/03008AA	Pecan		0.01 ppm 6.5 to 7.5 month preharvest interval through 1.89 pound per acre for foliar application. RESTRICTED USE PESTICIDE. Do not make more than 1 application. Do not apply more than 450 gallons of water per acre. Do not allow animals to graze on treated areas. Do not apply by aircraft.
IRAVAHA IZZZDGA	Pecan phylloxera Shoot curculio	0.37-0.42 lb/100 gal [30 gallons/ tree] (1, 1.63, 1.65 lb/gal EC) (20% EC)#	Foliar application. Apply thoroughly using airblast sprayer when buds are beginning to burst (early to mid-April). This control is not effective when typical gall symptoms appear.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28017AA	Peppers		1 ppm Do not apply after edible parts start to form through 0.75 pound per acre for foliar application. Preplant soil application through 1 pound per acre. For wettable powder formulations, apply in 100 to 200 gallons of water per acre.
IRACAAA	Aphids	0.1-0.4 lb/A (1% D) or 0.25 tsp actual*/gal or 0.25 lb/100 gal or 0.5-0.75 lb/A (25% WP) or 0.32 lb/A (1.7 lb/gal EC)	Foliar application. For armyworm, apply the higher dosage.
ITBCCFA	Armyworm		
ITBCCZA	Climbing cutworms		
INAMACA	Cucumber beetles		
INAMADA	Flea beetles		
IMAAAGA	Leafminers (including serpentine leafminer)		
IMOAAAA	Thrips		
ITBCABA	Cutworms	0.5 lb/100 gal or 1 lb/A (6% WP) or 0.31 lb/100 gal (10.68% EC)# or 0.03-0.04 oz**/gal [0.8 gal/100 sq.ft] (12.5%, 20% EC)#	Preplant soil application. Work into soil thoroughly during or before planting.
INBPAAA	White grubs		
INAVAAA	Wireworms		
/06013AA	Pineapple		1 ppm This use only occurs on intrastate and special local needs [24(c)] labeling and has not been included in this entry. Refer to appropriate labeling for use information and limitations.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/05005AA	**Plum**		1 ppm (plums, fresh prunes) 60 day preharvest interval through 1.56 pounds per acre for foliar application or through 0.62 pound per 100 gallons of water for bark application.
IRACAAA IMAAAEA INASAVA IMOAAAA	Aphids Leafrollers Plum curculio Thrips	0.31 lb/100 gal or 1.56 lb/A (10.68% EC)# or 0.03 oz**/gal (20% EC)#	Foliar application.
ITBQAHA	Peachtree borer	0.1 oz**/gal or 0.62 lb/100 gal (20% EC)#	Bark application. Apply to trunk and lower branches from crotch to ground. Soak bark to the point of runoff. First application should be made between July 10 and 15 followed by 2 subsequent applications at 21 to 28 day intervals.
		Refer to Prune for additional information.	
/05006AA /05005AA	**Prune**		1 ppm 60 day preharvest interval through 0.65 pound per acre for foliar application.
IRACAAA	Aphids	0.35-0.65 lb/A (1% D) or 0.5 pt 40% EC/100 gal (40% EC) or 0.67 pt 30%, 40% F1C/100 gal (30%, 40% F1C)	Foliar application.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/10011AA	Pumpkin		3 ppm No preharvest interval through 0.5 pound per acre. Preplant soil application through 2.06 pounds per acre. Seed treatment through 1 ounce per 100 pounds of seed. Do not apply after blossoms open. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.
		Refer to Cucumber for additional information.	
/14014AA	Radish		No tolerance established. Seed treatment through 0.5 ounce per 100 pounds of seed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.5 oz/100 lb seed (75% WP) (2.67, 4 lb/gal RTU) or 2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.33-2 fl.oz 30% FlC/100 lb seed (30% FlC) or 1-1.5 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method.
		0.5 oz/100 lb seed (25% D) (25% WP/D)	Seed treatment. Apply by planter box method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28071AA	Rye		No tolerance established. Seed treatment through 0.5 ounce per 100 pounds of seed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.5 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 1 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.33-2.67 fl.oz 30% FlC/100 lb seed (30% FlC) or 1-1.25 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
		0.375 oz/bu (18.75% D) or 0.5 oz/100 lb seed (25% D)	Seed treatment. Apply by planter box method.
		0.5 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28076AA	**Safflower**		No tolerance established. Seed treatment through 1.5 ounces per 100 pounds of seed for slurry method or through 2 ounces per bushel of seed for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.5-1.5 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 1.6 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.33-2.67 fl.oz 30% FlC/100 lb seed (30% FlC) or 1-1.25 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
		2 oz/bu (25% WP/D)	Seed treatment. Apply by planter box method.
		--OR MAI--	
		0.5 oz/100 lb seed (25% D)	
		0.75 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28019AA	**Sorghum** (including Milo Sorghum)		No tolerance established. Seed treatment through 1.25 ounces per 100 pounds of seed for slurry and dry methods or 2 ounces per bushel of seed for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	1-1.25 oz/100 lb seed (25%, 75% WP) (75% WP/D) or 0.5 oz/100 lb seed (2.67 lb/gal RTU) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-4 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 1 pint of liquid slurry per 100 pounds of seed.
		2 oz/bu (25% D) --OR MAI-- 0.42-0.58 oz/bu (16.6% D) or 1 oz/100 lb seed (25% D)	Seed treatment. Apply by planter box method.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Sorghum (including Milo Sorghum) (continued)		
		1-1.25 oz/100 lb seed (75% WP) (75% WP/D)	Seed treatment. Apply by dry method.
/28023AA	**Soybeans**		No tolerance established. Seed treatment through 2 ounces per bushel of seed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.5 oz/100 lb seed (25%, 75% WP) (75% WP/D) or 2 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.33-2 fl.oz 30% FlC/100 lb seed (30% FlC) or 1-1.5 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.
		2 oz/bu (25% WP/D)	Seed treatment. Apply by planter box method.
		--OR MAI--	
		0.42-0.58 oz/bu (12.5%, 16.6%, 18.75% D) or 0.5 oz/100 lb seed (25% D) or	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Soybeans (continued)		
		4 fl.oz 8.6% RTU/bu (8.6% RTU) or 5.5 fl.oz 10.5% RTU/bu (10.5% RTU)	
		0.5 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method.
/13024AA	Spinach		1 ppm Do not apply after seedling stage through 0.75 pound per acre. Preplant soil application through 2.06 pounds per acre. Seed treatment through 1 ounce per 100 pounds of seed. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.
IRACAAA ITBCABA INAMADA IMAAAGA IMOAAAA ITAAAMA	Aphids Cutworms Flea beetles Leafminers Thrips Webworms	0.1-0.4 lb/A (1% D) or 0.25 tsp actual*/gal or 0.38-0.75 lb/A (25% WP) or 0.42-0.43 lb/A (1.65, 1.7 lb/gal EC)	Foliar application.
ITBCABA INAMBIC INBPAAA INAVAAA	Cutworms Diabrotica beetles (larvae) White grubs Wireworms	0.25-0.5 lb/A (25% WP) or 0.41-0.52 lb/A (1.65 lb/gal EC)	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil. For garden symphylan, apply the higher dosage for heavy infestation.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Spinach (continued)		
IJDAABA	Garden symphylan	1.24-2.06 lb/A (1.65 lb/gal EC)	
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.75-1 oz/100 lb seed (25%, 75% WP) (75% WP/D) or 4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-4 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 1 pint of liquid slurry per 100 pounds of seed.
		1 oz/100 lb seed (25% D) (25%, 75% WP/D)	Seed treatment. May be applied by planter box or dry method.
/10012AA	Squash		3 ppm 1 day preharvest interval through 0.5 pound per acre. Preplant soil application through 2.06 pounds per acre. Seed treatment through 1.8 ounces per 100 pounds of seed. Late foliar treatment may result in reduction of quality at harvest. For wettable powder formulations, apply in a maximum of 200 gallons of water per acre.

Refer to Cucumber for additional information.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/01016AA	Strawberry		1 ppm Do not apply after fruit starts to form through 0.15 pound per acre. Soil application through 0.5 pound per acre.
ITBCABA	Cutworms	0.25-0.5 lb/A (25% WP)	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil.
INAMBIC	Diabrotica beetles (larvae)		
INBPAAA	White grubs		
INAVAAA	Wireworms		
IRAEAAA	Spittlebugs (including meadow spittlebug)	0.13-0.15 lb/A (0.5%, 1% D) (25% WP)	Foliar application. Apply in the spring when first leaves appear. Repeat at 5 to 10 day intervals. For strawberry weevil, thoroughly treat the flower buds.
INASAAA	Weevils (including strawberry weevil)		
/22011AA	Sudangrass		No tolerance established. Seed treatment through 0.5 ounce per 100 pounds of seed.
INAKABA	Seedcorn beetle	0.375-0.5 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 1.6 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 1.1-2.67 fl.oz 30% FlC/100 lb seed (30% FlC) or 0.8-1.25 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 1.2 pints of liquid slurry per 100 pounds of seed.
IOACAHA	Seedcorn maggot		
INBPAAA	White grubs		
INAVAAA	Wireworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Sudangrass (continued)		
		0.5 oz/100 lb seed (25% D) (75% WP/D)	Seed treatment. May be applied by planter box or dry method.
/28020AA	Sugar Beets		No tolerance established. Seed treatment through 4 ounces per 100 pounds of seed.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	3-4 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 10.8 fl.oz 30% FlC/100 lb seed (30% FlC) or 8 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 1 pint of liquid slurry per 100 pounds of seed.
		4 oz/100 lb seed (25% D) (25%, 75% WP/D)	Seed treatment. May be applied by planter box or dry method.
/28021AA	Sunflower		No tolerance established. Seed treatment through 1 ounce per 100 pounds of seed for slurry and dry methods or 2 ounces per bushel of seed for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	1 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
Sunflower (continued)		
	4 fl.oz 25% EC, RTU/100 lb seed (25% EC) (25% RTU) or 2.67-4 fl.oz 30% FlC/100 lb seed (30% FlC) or 2-3 fl.oz 40% FlC/100 lb seed (40% FlC)	
	2 oz/bu (25% WP/D)	Seed treatment. Apply by planter box method.
	--OR MAI--	
	0.56 oz/bu (18.75% D) or 1 oz/100 lb seed (25% D) or 4 fl.oz 8.6% RTU/100 lb seed (8.6% RTU)	
	1 oz/100 lb seed (75% WP/D)	Seed treatment. Apply by dry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/11005AA	Tomato		3 ppm Do not apply after fruit starts to form through 0.75 pound per acre. Preplant soil application through 2.06 pounds per acre. Seed treatment through 2 ounces per 100 pounds of seed.
IRACAAA	Aphids	0.1-0.4 lb/A (1% D) or 0.25 lb/100 gal (6% WP) or 0.25 tsp actual*/gal or 0.19-0.75 lb/A (25% WP) or 0.03 oz**/gal (0.36 lb/gal EC) or 0.31-0.33 lb/100 gal or 0.32-0.75 lb/A (1.6, 1.63, 1.7 lb/gal EC) (10.68% EC)#	Foliar application. For leafminers, apply the higher dosage.
ITBCCZA	Climbing cutworms		
INAMCFA	Colorado potato beetle		
INAMACA	Cucumber beetles		
INAMADA	Flea beetles		
IMAAAGA	Leafminers		
IQAQAAA	Plant bugs		
IMOAAAA	Thrips		
ITBCABA	Cutworms	0.25-0.5 lb/A (6%, 25% WP) or 0.41-0.52 lb/A (1.65 lb/gal EC) or 0.3 lb/100 gal (10.68% EC)# or	Preplant soil application. Spray directly on soil, then disc as soon as practicable to give thorough distribution in upper 4 to 6 inches of soil. For garden symphylan, apply the higher dosage for heavy infestation.
INAMBIC	Diabrotica beetles (larvae)		
INBPAAA	White grubs		
INAVAAA	Wireworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Tomato (continued)		
		0.03-0.04 oz**/gal [0.8 gal/100 sq.ft] (12.5%, 20% EC)#	
IJDAABA	Garden symphylan	1.24-2.06 lb/A (1.65 lb/gal EC)	
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	2 oz/100 lb seed (25% D) (25%, 75% WP) (25%, 75% WP/D)	Seed treatment. May be applied by slurry, planter box or dry method.
/28065AA	Wheat		No tolerance established. Seed treatment through 0.5 ounce per 100 pounds of seed for slurry and dry methods or 2 ounces per bushel for planter box method.
INAKABA IOACAHA INBPAAA INAVAAA	Seedcorn beetle Seedcorn maggot White grubs Wireworms	0.25-0.5 oz/100 lb seed (25%, 75% WP) (75% WP/D) (2.67, 4 lb/gal RTU) or 1-2 fl.oz 25% EC, 30% FlC, 25% RTU/100 lb seed (25% EC) (30% FlC) (25% RTU) or 1-3 fl.oz 40% FlC/100 lb seed (40% FlC)	Seed treatment. Apply by slurry method. Apply 0.5 pint of liquid slurry per 100 pounds of seed.

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
Wheat (continued)		
	2 oz/bu (25% WP/D) or 0.5-2 oz/100 lb seed (25% D) (25% WP/D)	Seed treatment. Apply by planter box method.
	--OR MAI--	
	0.5-0.81 oz/100 lb seed (12.5%, 25% D) or 0.28-0.375 oz/bu (18.75% D) or 3 fl.oz 8.6%, 10.5% RTU/bu (8.6%, 10.5% RTU)	
	0.25-0.5 oz/100 lb seed (75% WP) (75% WP/D)	Seed treatment. Apply by dry method.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	TERRESTRIAL NON-FOOD CROP		
	(Agricultural Crops)		
/26003AA	Tobacco		Foliar application through 0.2 pound per acre. Transplant water treatment through 2 ounces per 100 gallons of water.
ITBCABA INAVAAA	Cutworms Wireworms	2 oz/100 gal transplant water (25% WP) or 4 fl.oz 10% EC/100 gal transplant water (10% EC) or 2-4 fl.oz 20% EC/100 gal transplant water (20% EC)	Transplant water treatment. From tobacco setter water tank, move transplanting water through hose to setter shoe, and dispense into roots of plants mechanically as setter finger releases plant and plant roots are covered with soil inside setter shoe. Apply 0.5 pint of finished spray per plant or 200 to 250 gallons per acre. Do not dip tobacco roots directly into solution as root damage may occur.
IRACCUA	Green peach aphid	0.2 lb/A (1% D)	Foliar application to plant beds.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	(Ornamental Plants)		
35022AA	Ash		
ITBQAEA	Lilac borer	0.5 lb/100 gal or 0.5 tbls actual*/gal (25% WP) or 3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply in late June or early July.
		1.6 gal 5% EC/100 gal or 4 tbls 5% EC/gal (5% EC)	Bark application. Apply in late June or early July.
		Refer to Aspen for additional information.	
		Refer to Boxelder cluster for additional information.	
/35023AA /35022AA /35049AA /35077AA /35083AA /35101AA /35128AA	Aspen		
IRACAAA INBQAAA INAAADA	Aphids Bark beetles Wood boring beetles	1.2 lb/100 gal or 0.2 oz**/gal (1.63 lb/gal EC) or 1.25 gal 12.5% EC/100 gal (12.5% EC) or	RESTRICTED USE PESTICIDE. Foliar and bark application. Apply in spring when buds begin to break. Repeat in 10 to 14 days.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Aspen (continued)		
		3 tbls 12.5% EC/gal (12.5% EC) or 0.75 gal 20% EC/100 gal or 2 tbls 20% EC/gal (20% EC)	
		3 gal 5% EC/ 100 gal or 9 tbls 5% EC/ gal (5% EC) or 0.75 gal 20% EC/100 gal or 2 tbls 20% EC/gal (20% EC)	Foliar and bark application. Apply in spring when buds begin to break. Repeat in 10 to 14 days.
/35024AA /35113AA /35126AA	Austrian Pine		
IRAVALA	Pine bark adelgid	0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Bark application. Apply when immature adelgids are present.
/34022AA	Azalea		
INALBAA	Azalea stem borer	3 pt 20% EC/ 100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Make 2 to 3 applications at 7 to 10 day intervals in May and June.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Azalea (continued)		
IQAXAAA	Lace bugs	0.3-0.5 lb/A (1% D) or 0.25-0.375 lb/100 gal or 0.25 tbls actual*/gal (25% WP) or 0.3 lb/100 gal or 0.05 oz**/gal (1.65 lb/gal EC) or 3 pt 10% EC/100 gal or 3 tsp 10% EC/gal (10% EC)	RESTRICTED USE PESTICIDE. Foliar application. Apply just after hatching and when small nymphs first appear. Repeat in 10 days or as needed. This will usually be about May 15 and at 30 day intervals.
		2.5 pt 12.8% EC/100 gal or 1 tbls 12.8% EC/gal (12.8% EC)	Foliar application. Apply in spring when nymphs first appear and repeat as needed.
		Refer to Camellia for additional information.	
/35027AA /35028AA /35049AA /35083AA /35119AA /35128AA	**Beech**		
IRACAAA	Aphids	0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Foliar application. Apply when new growth is about 2 inches long, before leaves curl. Repeat as needed.
		Refer to Boxelder cluster for additional information.	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/35028AA	**Birch**		
IMAAAGA	Leafminers (including birch leafminer)	0.25 lb/100 gal (25% WP) or 0.03 oz**/gal (1.63 lb/gal EC) or 2 tsp 12.5% EC/gal (12.5% EC) or 1 pt 20% EC/100 gal or 1 tsp 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Foliar application. Apply when small miners appear in early and mid-May. Repeat in 4 to 6 weeks to control second generation.
		4.5 tsp 5% EC/gal (5% EC) or 1 tsp 20% EC/gal (20% EC)	Foliar application. Apply when small miners appear in early and mid-May.
		Refer to Beech for additional information.	
		Refer to Cottonwood for additional information.	
/35034AA	**Boxelder**		
/35071AA	**Horsechestnut**		
/35075AA	**Linden**		
/35022AA			
/35027AA			
/35133AA			
/35049AA			
/35083AA			
/35093AA			
/35101AA			
/35119AA			
/35128AA			
INAHAAA	Flatheaded wood borers	-- (1% RTU)	Bark application. Pour product into a sprayer bottle that can be adjusted to deliver a pinpoint stream. Inject into feeding entry hole. Re-

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Boxelder cluster (continued)		
			peat in 5 to 7 days if feeding signs are still observed. Do not apply as a treatment that encircles a limb or trunk since damage will result to plant. Apply as soon as symptoms are first observed. The symptoms can include a damp spot on the bark at the point of early infestation, developing until the sap drips from the spot; discoloration of bark overlying the tunnel; and the possible appearance of dry feces at the entrance to or just below the tunnels. If the treated areas have not dried within 7 to 10 days, treatment should be repeated.
/34031AA	Boxwood		
IOAHASA IRAXAIA	Boxwood leafminer Boxwood psyllid	0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Foliar application. For leafminers, apply when new growth appears. For psyllid, apply when new growth appears and repeat in 7 days.
/35152AA	California Red Fir		
/35159AA	Coulter Pine		
/35164AA	Digger Pine		
/35044AA	Douglas-Fir		
/35196AA	Monterey Pine		
/35100AA	Ponderosa Pine		
/35219AA	Sugar Pine		
/35228AA	White Fir		
INBQAVA INBQAUA INBQANA	Douglas-fir beetle Mountain pine beetle Western pine beetle	1.7 lb/15 gal fuel oil or water [1.33 gal/ 235 sq.ft total bark surface area] (1.7 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Apply 7 days before adults begin to emerge. Hold the spray nozzle between 1 and 1.5 feet from bark during application. Application to the point of runoff is unnecessary, instead make an accurate, uniform application.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/34036AA /34022AA /34118AA	Camellia		
INAMACA	Cucumber beetles (adults and larvae)	0.2 lb/100 gal (1.7 lb/gal EC) or 1 pt 20% EC/ 100 gal or 1 tsp 20% EC/ gal (20% EC)	RESTRICTED USE PESTICIDE. Soil application. Saturate soil around plants in beds. For potted plants, spray soil surface lightly.
INASCWA	Fuller rose beetle (adults and larvae)		
INASCTC	Otiorhynchus weevils (larvae)		
INASCQA	Strawberry root weevil		
INAVAAA	Wireworms		
		1 tsp/gal/50 sq.ft (5% EC)	Soil application. Apply to soil around plant in spring and fall. Formulated with dicofol, carbaryl, and malathion.
		4 tsp/gal/ 35 sq.ft (5% EC)	Soil application. Apply to soil around plants. Formulated with dicofol, methoxychlor, and malathion.
/35039AA	Chestnut		
INAHAEA	Twolined chestnut borer	0.5 lb/100 gal or 0.5 tbls actual*/gal (25% WP) or 3 pt 20% EC/ 100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Make 2 applications in mid and late June.
		1.6 gal 5% EC/100 gal or 4 tbls 5% EC/gal (5% EC)	Bark application. Make 2 applications in mid and late June.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/30005AA	Christmas Tree Plantations		
IRAVAFA	Balsam woolly adelgid	0.8 lb/100 gal diesel oil (1.6 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark and foliar application. Apply to base of tree 18 inches up, higher if there are infestations. Spray entire tree during May, June, or July. In case of danger to shrubbery or lawns, substitute water for diesel oil.
INBQAAA	Bark beetles	0.7 oz/gal (1.7 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Spray trunks and branches of growing trees June 1 and again about August 1.
		Refer to Ornamental Evergreens for additional information.	
/31065AA	Chrysanthemum		
IQAXAAA	Lace bugs	0.3-0.5 lb/A (1% D)	RESTRICTED USE PESTICIDE. Foliar application. Apply when pests first appear and repeat as needed.
/35133AA /35028AA /35101AA /35128AA	Cottonwood		
INAHABA	Bronze birch borer	0.5 lb/100 gal or 0.5 tbls actual*/gal (25% WP) or 3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply in mid and late June.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Cottonwood (continued)		
		1.6 gal 5% EC/100 gal or 4 tbls 5% EC/gal (5% EC)	Bark application. Apply in mid and late June.
		Refer to Boxelder cluster for additional information.	
/31083DA	Daffodil		
INAVAAA	Wireworms	0.5-0.75 oz/ 100 bulbs (25% WP/D)	RESTRICTED USE PESTICIDE. Bulb application. Dust bulbs at time of planting.
		Refer to Hyacinth cluster for additional information.	
/35043AA	Dogwood		
ITBQAOA	Dogwood borer	0.5 tbls actual*/gal or 0.75 lb/100 gal (25% WP) or 0.1 oz**/gal (1.63, 1.65 lb/gal EC) or 0.6 lb/100 gal (1.65 lb/gal EC) or 6 pt 10% EC/ 100 gal or 2 tbls 10% EC/gal (10% EC) or 5 tsp 12.5% EC/gal (12.5% EC) or	RESTRICTED USE PESTICIDE. Bark application. Make 2 to 3 applications at 7 to 10 day intervals in May and early June. Apply to trunk and lower limbs, particularly to injured areas and old borer wounds.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Dogwood (continued)		
		3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	
		1.6 gal 5% EC/100 gal or 4-4.5 tbls 5% EC/gal (5% EC) or 5 pt 12.8% EC/100 gal or 5 tsp 12.8% EC/gal (12.8% EC) or 1 tbls 20% EC/gal (20% EC)	Bark application. Make 2 to 3 applications at 7 to 10 day intervals in May and early June.
/35049AA	**Elm** (including English Elm and Scotch Elm)		
INBQAAA	Bark beetles	-- (1% RTU)	Bark application. Pour product into a sprayer bottle than can be adjusted to deliver a pin point stream. Inject into entrance holes of the borers. Repeat in 5 to 7 days if feeding signs are still observed. Do not apply as a treatment that encircles a limb or trunk since damage will result to plant.
IMAAAGA	Leafminers (including elm leafminer)	0.25 lb/100 gal (25% WP) or 0.03 oz**/gal (1.63 lb/gal EC) or	RESTRICTED USE PESTICIDE. Foliar application. Apply when small miners appear in early and mid-May. Repeat 2 or 3 weeks later to control second generation.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Elm (including English Elm and Scotch Elm) (continued)		
		2 tsp 12.5% EC/gal (12.5% EC) or 1 pt 20% EC/100 gal or 1 tsp 20% EC/gal (20% EC)	
		4.5 tsp 5% EC/gal (5% EC) or 1 tsp 20% EC/gal (20% EC)	Foliar application. Apply when small miners appear in early and mid-May.
		Refer to Aspen for additional information.	
		Refer to Beech for additional information.	
		Refer to Boxelder cluster for additional information.	
/35051AA	Fir		
IRAVAFA	Balsam woolly adelgid	0.8 lb/100 gal diesel oil (1.6 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark and foliar application. Apply to base of tree 18 inches up, higher if there are infestations. Spray entire tree during May, June, or July. In case of danger to shrubbery or lawns, substitute water for diesel oil.
/35055AA	Flowering Cherry		
IQAXAAA	Lace bugs	0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Foliar application. Apply just after hatching and when small nymphs can be seen. Repeat in 10 days.
		Refer to Flowering Ornamental Fruit Trees for additional information.	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/xxxxxAA	Flowering Ornamental Fruit Trees		
IRACAAA	Aphids	0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Foliar application. Apply when new growth is about 2 inches long, before leaves curl. Repeat as needed.
INALBNA	Roundheaded apple-tree borer	0.5 lb/100 gal or 0.5 tbls actual*/gal (25% WP) or 3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply at 21 day intervals from June to August.
		1.6 gal 5% EC/100 gal or 4 tbls 5% EC/gal (5% EC)	Bark application. Apply at 21 day intervals from June to August.
/31111AA /31111DA	Gladiolus		
IMOAAAA	Thrips	0.1-0.4 lb/A (1% D)	Foliar application. Repeat as needed.
		0.25-0.4 lb/A (1% D) or 0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Foliar application. Repeat as needed.
		-- (1% D)	Foliar application. Apply twice a week from early stages until spikes begin to open. Repeat as needed at 7 to 10 day intervals until control is achieved. Formulated with zineb and thiram.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Gladiolus (continued)		
INAVAAA	Wireworms	0.5-0.75 oz/ 100 bulbs (25% WP/D)	RESTRICTED USE PESTICIDE. Bulb application. Dust bulbs at time of planting.
		Refer to Tulips for additional information.	
/34066AA /35093AA /35119AA	Hawthorn		
IQAXAAA	Lace bugs	0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Foliar application. Apply just after hatching and when small nymphs can be seen. Repeat in 10 days.
/35068AA /35321AA	Hemlock Taxus Compacta		
INASCSA INASCQA	Black vine weevil Strawberry root weevil	0.1 oz**/gal (1.63 lb/gal EC) or 5 tsp 12.5% EC/gal (12.5% EC) or 3-4 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply in May or early June to the trunks and around base of trees soaking the bark and wetting the soil surface.
		4.5 tbls 5% EC/gal (5% EC) or 1 tbls 20% EC/gal (20% EC)	Bark application. Apply in May or early June to the trunks and around base of trees soaking the bark and wetting the soil surface.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/34070AA	Holly		
IMAAAGA	Leafminers	1 pt 20% EC/ 100 gal or 1 tsp 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Foliar application. Apply when adult miners appear in April and mid-May. Repeat when smaller miners appears in July.
/31123DA /31142DA /31083DA	Hyacinth Narcissus		
IRACAAA	Aphids	0.1 lb/40 gal (6% WP) (1.63 lb/gal EC) or 1 pt 10.68% EC/40 gal or 2.4 tsp 10.68% EC/ gal (10.68% EC)	RESTRICTED USE PESTICIDE. Bulb application. Apply as a spray when pests first appear and repeat as needed.
IOBJAFA	Bulb flies		
ITBMCCA	European corn borer		
ITBCBUA	Iris borer		
IMOAAAA	Thrips		
/31126AA /31126DA	Iris		
IRACAAA	Aphids	0.1 lb/40 gal (6% WP) (1.63 lb/gal EC) or 1 pt 10.68% EC/40 gal or 2.4 tsp 10.68% EC/ gal (10.68% EC) or 5 tsp 12.5% EC/gal (12.5% EC) or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bulb application. Apply as a spray when pests first appear and repeat as needed.
IOBJAFA	Bulb flies		
ITBMCCA	European corn borer		
ITBCBUA	Iris borer		
IMOAAAA	Thrips		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Iris (continued)		
ITBCBUA	Iris borer	1 tsp 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Foliar application. In early spring destroy old leaves. Apply during April and May.
		4 tsp 5% EC/gal (5% EC)	Foliar application.
/35185AA /35113AA /35126AA	Japanese Black Pine		
INASDBA	White pine weevil	2 qt 20% EC/ 100 gal or 1.33 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Foliar application. Apply thoroughly covering terminals. Apply during April in Northeastern United States. Consult your State Agricultural Extension Service for timing in other areas.
/35073AA	Juniper		
INALBCA	Twig girdler	1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Foliar application. Make 2 applications at 30 day intervals. In northern CA, apply June and mid-July. In southern CA, apply April and May.
		1 tbls 20% EC/gal (20% EC)	Foliar application. Make 2 applications at 30 day intervals. In northern CA, apply June and mid-July. In southern CA, apply April and May.
/34089AA	Lilac		
ITBQAEA	Lilac borer	0.5 lb/100 gal or 0.5 tbls actual*/gal (25% WP) or 0.1 oz**/gal (1.63, 1.65 lb/gal EC) or	RESTRICTED USE PESTICIDE. Bark application. Make 2 to 3 applications at 7 to 10 day intervals in May and early June. Apply to trunk and lower limbs, particularly to injured areas and old borer wounds.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Lilac (continued)		
		0.6 lb/100 gal (1.65 lb/gal EC) or 5 tsp 12.5% EC/gal (12.5% EC) or 3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	
		1.6 gal 5% EC/100 gal or 4-4.5 tbls 5% EC/gal (5% EC) or 5 pt 12.8% EC/100 gal or 5 tsp 12.8% EC/gal (12.8% EC) or 1 tbls 20% EC/gal (20% EC)	Bark application. Make 2 to 3 applications at 7 to 10 day intervals in May and early June.
/31131DA	**Lilies**		
IRACAAA	Aphids	0.1 lb/40 gal (6% WP) (1.63 lb/gal EC) or 1 pt 10.68% EC/40 gal (10.68% EC) or	RESTRICTED USE PESTICIDE. Bulb application. Apply as a spray when pests first appear and repeat as needed.
IOBJAFA	Bulb flies		
ITBMCCA	European corn borer		
ITBCBUA	Iris borer		
IMOAAAA	Thrips		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Lilies (continued)		
		2.4 tsp 10.68% EC/gal (10.68% EC) or 5 tsp 12.5% EC/gal (12.5% EC) or 1 tbls 20% EC/gal (20% EC)	
/35077AA	Locust (including Black Locust)		
INAHAWA	Honeylocust borer	1.6 gal 5% EC/100 gal or 4 tbls 5% EC/gal (5% EC)	Bark application. Apply in early June.
IMAAAGA	Leafminers (including locust leafminer)	0.25 lb/100 gal (25% WP) or 0.03 oz**/gal (1.63 lb/gal EC) or 2 tsp 12.5% EC/gal (12.5% EC) or 1 pt 20% EC/100 gal or 1 tsp 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Foliar application. Repeat when small miners appear in early July. Make 1 or 2 additional applications as new miners and adult feeding appear.
		4.5 tsp 5% EC/gal (5% EC) or 1 tsp 20% EC/gal (20% EC)	Foliar application. Apply when small miners appear in early July.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Locust (including Black Locust) (continued)		
INALAPA	Locust borer	0.5 lb/100 gal or 0.5 tbls actual*/gal (25% WP) or 3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply in early June.
		Refer to Aspen for additional information.	
/35083AA	**Maple**		
		Refer to Aspen Refer to Beech. Refer to Boxelder cluster.	
/35085AA	**Mountainash**		
INALBNA	Roundheaded appletree borer	1.6 gal 5% EC/100 gal or 4 tbls 5% EC/gal (5% EC)	Bark application. Apply at 21 day intervals from June to August.
/31142DA	**Narcissus**		
IRACAAA IOBJAFA ITBMCCA ITBCBUA IMOAAAA	Aphids Bulb flies European corn borer Iris borer Thrips	0.1 lb/40 gal (6% WP) (1.63 lb/gal EC) or 1 pt 10.68% EC/40 gal or 2.4 tsp 10.68% EC/gal (10.68% EC)	RESTRICTED USE PESTICIDE. Bulb application. Apply as a spray when pests first appear and repeat as needed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/35093AA	Oak		
		Refer to Hawthorn.	
		Refer to Boxelder cluster.	
/35000AA	Ornamental and/or Shade Trees		
INBQAAA	Bark beetles	2.5 gal 20% EC/100 gal or 6 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply as soon as possible after damage has been done to tree.
INBQBIA INBQAOA	Pine engraver Southern pine beetle	1 lb/55 gal (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Apply to entire length of tree at first sign of infestation. Repeat at 30 day intervals. If heavy infestations are in the vicinity, preventative sprays may be used for valuable trees.
INBQAOA	Southern pine beetle	4.5 qt 20% EC/100 gal fuel oil or 3 tbls 20% EC/gal fuel oil (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply to the point of runoff to aid in control of pest.
		1.2-2.5 gal 20% EC/100 gal or 3-6 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply before trees are attacked when epidemic in the vicinity.
INBQAYA	Turpentine beetles	1 lb/14 gal diesel oil (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Apply to the basal 18 inches of the trunk, higher if infestation is present. Repeat at 30 day intervals. Shade trees examined regularly need not be sprayed until infestation begins. In case of danger of injury to shrubbery, substitute water for oil.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental and/or Shade Trees (continued)		
		13 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Spray trunk to about 12 feet from ground to the point of runoff.
		Refer to Ornamental Evergreens for additional information.	
		Refer to Ornamental Woody Shrubs for additional information.	
/35006AA	Ornamental Deciduous Trees		
INAHAAA	Flatheaded wood borers	1 oz/gal (1 lb/gal EC) or 6 fl.oz 17% EC/gal (17% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply as a preventative spray on uninfested trees. Spray the main trunk of the tree thoroughly up to 8 feet above the ground. Make first application in early spring and repeat at 3 to 6 month intervals. For control of borers, clean out borer hole using knife or wire probe. Inject undiluted into holes with stream type applicator and seal with mud or putty.
INALAAA	Roundheaded wood borers		
/32005AA /30005AA /35000AA	Ornamental Evergreens		
IRACAAA	Aphids (including balsam twig aphid and white pine aphid)	0.3 lb/100 gal or 0.05 oz**/gal (1.7 lb/gal EC)	RESTRICTED USE PESTICIDE. Foliar and/or bark application. A minimum of 3 applications is necessary for effective control; May 10 to 15, June 1, and July 1. In colder latitudes such as upstate New York, apply approximately May 15 to 20, June 10, and July 10.
ISBEAMA	Birch leafminer		
ISBEANA	Elm leafminer		
ISBIAIA	European hornet		
IQAXAAA	Lace bugs		
IRAXAAA	Psyllids		
IRAEAAA	Spittlebugs (including pine spittlebug)		
IMOAAAA	Thrips		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Evergreens (continued)		
IMAAACA	Wood boring insects (including bronze birch borer, carpenterworm, dogwood borer, elm borer, leopard moth, lilac borer, locust borer, pine root collar weevil, rhododendron stem borer, sugar maple borer, and white pine weevil)	0.85 lb/100 gal or 0.14 oz**/gal (1.7 lb/gal EC)	
/330100A	Ornamental Lawns		Keep children and pets off treated areas until material has been washed into the soil and the grass is completely dried.
ISASAAA ITBCABA INBPAAA INAVAAA	Ants Cutworms White grubs Wireworms	1-2 tbls 5% EC/gal [143 gal/5,000 sq.ft] (5% EC)	Application to established lawns. Formulated with dicofol, methoxychlor, and malathion.
ISASAAA IRAFAAA IRAEAAA	Ants Leafhoppers Spittlebugs	0.125 lb/5,000 sq.ft (1% D) (25% WP) (1.65 lb/gal EC) or 1 pt 10% EC/5,000 sq.ft (10% EC)	RESTRICTED USE PESTICIDE. Application to established lawns. Repeat as needed.
		0.2 lb/5,000 sq.ft (1% D)	Application to established lawns. Apply after rain or watering and do not water for at least 2 days after application. Repeat in 14 to 21 days if needed. Formulated with dicofol, zineb, dinocap, and carbaryl.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Lawns (continued)		
ITBCCFA	Armyworm	40-53.33 fl.oz 4.6% EC/75 gal/ 5,000 sq.ft (4.6% EC)	Application to established lawns. Mow lawn and water thoroughly 1 to 2 days prior to treatment. On dichondra and matted grass lawns, sprinkle lightly immediately after treatment to improve effectiveness. Heavy watering or irrigation should be withheld for 2 to 3 days following treatment. Repeat at 4 to 6 week intervals if needed. However, with extremely severe infestations of cutworms (particularly on dichondra lawns) a repeat application may be required in 1 to 2 days. Applications are most effective during the 2 hour period prior to darkness when insects become active. Formulated with naled.
INASDUC	Billbugs (larvae)		
ITBCABA	Cutworms		
ITASADA	Fiery skipper (larvae)		
IRAFAAA	Leafhoppers		
INASCTC	Otiorhynchus weevils (larvae)		
ITBMABA	Sod webworms		
IJDAAAA	Symphylans		
IMOAAAA	Thrips		
INBPAAA	White grubs		
INAVAAA	Wireworms		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/32000AA /32000DA	Ornamental Plants		

This broad site includes such specific sites as:

- Arborvitae
- Aster
- Azalea
- Boxwood
- Camellia
- Carnation
- Chrysanthemum
- Coleus
- Dahlia
- Daisy
- Delphinium
- Dogwood
- Euonymous
- Forsythia
- Gardenia
- Geranium
- Gladiolus
- Heather
- Hemlock
- Hibiscus
- Holly
- Hydrangea
- Iris
- Juniper
- Larkspur
- Lilac
- Nasturtium
- Pansy
- Peony
- Petunia
- Primrose
- Rhododendron
- Rose
- Snapdragon
- Spirea
- Sweet Pea
- Yew
- Zinnia

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
ISASAAA	Ants	0.3-0.5 lb/A (1% D) or 0.25 lb/100 gal (6%, 25% WP) or 0.5-0.75 tsp actual*/gal (25% WP) or 0.25 tbls actual*/gal (25% WP/D) or 0.2-0.25 lb/100 gal (1.6, 1.63, 1.65 lb/gal EC) or 0.03-0.1 oz**/gal (1.6, 1.65 lb/gal EC) or 2-3 pt 10% EC/100 gal (10% EC) or	RESTRICTED USE PESTICIDE. Foliar application.
IRACAAA	Aphids (including rose aphid)		
ITBCCFA	Armyworm		
INASCSA	Black vine weevil		
INBGAAA	Blister beetles		
ITBCCSA	Cabbage looper		
INAMACA	Cucumber beetles		
INAMBIA	Diabrotica beetles		
INAMADA	Flea beetles (including larvae)		
INASCWA	Fuller rose beetle		
IVABAAA	Grasshoppers		
INBPAZA	Japanese beetle		
IQAXAAA	Lace bugs		
IRAFAAA	Leafhoppers (including rose leafhopper)		
IMAAAGA	Leafminers (including birch leafminer, boxwood leafminer, and oak leafminer)		
IMAAAEA	Leafrollers		
IQAMAAA	Plant bugs (including fourlined plant bug and tarnished plant bug)		
IRAXAPA	Psyllas		
INBPAUA	Rose chafer		
INAMCLA	Rose leaf beetle		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Plants (continued)		
	Pest list continued from previous page.		
IRAEAAA IMOAAAA IRABAAA	Spittlebugs Thrips Whiteflies	2-3 tsp 10% EC/gal (10% EC) or 2.5 pt 10.68% EC/100 gal or 2.4 tsp 10.68% EC/gal (10.68% EC) or 2 pt 12.5% EC/100 gal (12.5% EC) or 2 tsp 12.5% EC/gal or 1-1.25 pt 20% EC/100 gal or 1-1.2 tsp 20% EC/gal (20% EC) or 6 fl.oz 30%, 40% FlC/100 gal (30%, 40% FlC)	
		0.03 oz**/gal (0.36 lb/gal EC) or 2.5 pt 10% or 12.8% EC/100 gal or 1 tbls 10% or 12.8% EC/gal (10%, 12.8% EC) or	Foliar application. Repeat at 7 to 10 day intervals or as needed. May be formulated with one or a combination of: dicofol, mancozeb, zineb, methoxychlor, dinocap, naphthalene, carbaryl, malathion, sulfur, captan, and folpet.

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
Ornamental Plants (continued)		
	0.25 pt 40% EC/100 gal (40% EC)	
	--OR MAI--	
	0.02 oz/100 sq.ft (1% D) or 0.24 lb/100 gal/A or 0.15 tbls actual*/gal (3% WP) or 0.09 oz/gal (9% WP) or -- [dust] or 0.03 tbls actual*/gal (0.5% WP/D) or -- [dust] or 0.08 tbls actual*/gal (1% WP/D) or 2-12 tsp 5% EC/gal (5% EC) or 2-4 tbls 0.5% FlC/gal (0.5% FlC)	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Plants (continued)		
IMAAACA	Wood boring insects (including leopard moth, red oak borer, and sugar maple borer)	-- (2% RTU)	Bark application. For borers in trees and shrubs, apply when larvae are active as is evidenced by fresh borings being pushed to the surface of the bark. Insert the applicator into the burrow of the larvae and squeeze a substantial quantity of the formulation into the burrow. Close the openings of the burrow with wet soil after treatment unless closed by the paste itself. After treatment, re-examine regularly to detect any bore damage neglected in previous treatments. Repeat if needed. For borers in flowers, inject small amounts of formulation into borer holes showing signs of activity by the larvae. This is indicated by borings or frass being pushed through holes in the stems. Inject in the lower hole if several are present or where the freshest signs of activity are indicated. To avoid injury to tender plants a very small portion, the size of a small pea, should be injected.
/34004AA /35000AA	Ornamental Woody Shrubs		
INALAAA	Roundheaded wood borers	-- (1% RTU)	Bark application. Pour product into a sprayer bottle that can be adjusted to deliver a pinpoint stream. Inject into feeding entry hole. Repeat in 5 to 7 days if feeding signs are still observed. Do not apply as a treatment that encircles a limb or trunk since damage will result to plant. The most successful treatment is at the beginning of the larval stage or during the pupal stage at both of which times the pests are located just under the bark. Consult your State Agricultural Extension Service to determine the life cycle of the borer to be controlled.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/35098AA	Pine		
			Around homes where there is danger of phytotoxicity to plants or lawns from oil drift, water dilution is more desirable.
INBQAAA	Bark beetles	0.7 oz/gal (1.7 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Spray trunks and branches of growing trees June 1 and again about August 1.
		-- (1% RTU)	Bark application. Pour product into a sprayer bottle that can be adjusted to deliver a pin point stream. Inject into entrance holes of the borers. Repeat in 5 to 7 days if feeding signs are still observed. Do not apply as a treatment that encircles a limb or trunk since damage will result to plant.
INBQAZA	Black turpentine beetle	1.375 oz/gal water (1 lb/gal EC) or 8 fl.oz 17% EC/gal water (17% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply given dosage for prevention or control. Completely cover the main tree trunk from the first branches down to the ground line, starting at the uppermost point and working to the base of the tree. Repeat at 3 to 6 month intervals. Spray all trees in infested area to prevent attack by beetles on uninfested trees. Do not spray when bark is wet.
		1.2 oz/gal water (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Remove loose bark and trash exposing base of trunk. Apply as a coarse spray to the point of runoff. Spray from soil line to 2 feet above the ground. Repeat after 30 days.
		9 fl.oz 11% EC/gal water (11% EC)	RESTRICTED USE PESTICIDE. Bark application. Spray lower 10 feet of tree, exposed roots, and fresh stumps with a medium spray to point of runoff. Apply at high enough pressure to penetrate cracks in bark of trees. Repeat as needed. Do not spray when bark is wet.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Pine (continued)		
INBQAZA INBQBAA	Black turpentine beetle Red turpentine beetle	0.5 oz/gal no. 2 fuel oil or 0.75 oz/gal water (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application for prevention of infestation. Spray only the bottom 30 inches of trunk. Spray harvested logs or pulpwood from infested trees which are not removed immediately to prevent infestation of nearby trees. Stumps of harvested trees should be sprayed soon after cutting.
		1 oz/gal no. 2 fuel oil or 1.5 oz/gal water (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application for control of existing infestations. Spray the bark surface of the trunk up to a height of 6 feet. Slough off the loose flaky bark and debris before application. Use a cone-shaped spray nozzle producing a coarse spray and apply at high enough pressure to force the spray into cracks and crevices of bark. Apply to the point of runoff, approximately 1 gallon per 40 to 50 square feet of bark surface. Do not apply more often that at 6 month intervals.
INBQBYA	Ips beetles	0.3 oz/gal water (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Spray entire length of trunk and limbs at first sign of infestation. Repeat at 30 day intervals as needed. Use preventative sprays during outbreak periods.
		4 fl.oz 17% EC/gal water (17% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply given dosage for prevention or control. Completely cover the main tree trunk from the first branches down to the ground line, starting at the uppermost point and working to the base of the tree. Repeat at 3 to 6 month intervals. Spray all trees in infested area to prevent attack by beetles on uninfested trees. Do not spray when bark is wet.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Pine (continued)		
INASCYA INASBRA	Northern pine weevil Pales weevil	2 qt 20% EC/ 100 gal (20% EC)	RESTRICTED USE PESTICIDE. Foliar application. Apply to young seedlings in early April to May and/ or October.
		2.5 gal 20% EC/100 gal water or fuel oil (20% EC)	RESTRICTED USE PESTICIDE. Application to freshly cut stumps. Apply in March or early April and/or October. Apply thoroughly to tops and sides of stumps to the point of runoff.
INBQBZA	Pine beetles (including turpentine beetles)	0.2 lb/5 gal water (1.63, 1.65 lb/gal EC) or 0.3 lb/5 gal water or 0.2 lb/5 gal kerosene or no. 2 fuel oil (1.7 lb/gal EC) or 2 pt 10% EC/5 gal water [1 gal/50 sq.ft of bark surface] (10% EC) or 26 fl.oz 12.5% EC/5 gal water (12.5% EC) or 15 fl.oz 20% EC/5 gal water (20% EC) or	RESTRICTED USE PESTICIDE. Bark application. Apply thoroughly to the point of runoff to a height of 6 feet. Apply at first sign of infestation and repeat in 3 to 6 months if needed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Pine (continued)		
		16 fl.oz 20% EC/5 gal water, kerosene, or no. 2 fuel oil (20% EC)	
		2 qt 5% EC/5 gal water (5% EC) or 1.5 pt 12.8% EC/5 gal water (12.8% EC) or 0.9-1 pt 20% EC/5 gal water (20% EC)	Bark application. Apply thoroughly to the point of runoff to a height of 6 feet. Apply at first sign of infestation and repeat in 3 to 6 months if needed.
INASBSA	Pine root collar weevil	3-4 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply in June to the trunks and lower branches and soak the soil around the base of tree.
INBQAOA	Southern pine beetle	0.3 oz/gal water (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Spray entire length of trunk and limbs at first sign of infestation. Repeat at 30 day intervals as needed. Use preventative sprays during outbreak periods.
		0.75 oz/gal water (1 lb/gal EC) or 4 fl.oz 17% EC/gal water (17% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply given dosage for prevention or control. Completely cover the main tree trunk from the first branches down to the ground line, starting at the uppermost point and working to the base of the tree. Repeat at 3 to 6 month intervals. Spray all trees in infested area to prevent attack by beetles on uninfested trees. Do not spray when bark is wet.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Pine (continued)		
		2.5 fl.oz 11% EC/gal water (11% EC)	RESTRICTED USE PESTICIDE. Bark application. Spray entire trunk with a medium spray to the point of runoff. Apply at high enough pressure to penetrate cracks in bark of tree. Repeat in 30 to 60 days.
		2.3 gal 20% EC/100 gal fuel oil or 3 tbls 20% EC/gal fuel oil (20% EC)	RESTRICTED USE PESTICIDE. Application to tops and stumps. Spray bark to the point of runoff to reduce populations left in tops and stumps.
INASDBA	White pine weevil	0.1 oz**/gal (1.63 lb/gal EC) or 5 tsp 12.5% EC/gal (12.5% EC)	RESTRICTED USE PESTICIDE. Delayed dormant application. Apply thoroughly to entire tree in late April when buds swell.
		4.5 tbls 5% EC/gal (5% EC) or 3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	Delayed dormant application. Apply thoroughly to entire tree in late April when buds swell.
ITBMBCA	Zimmerman pine moth	0.5 lb/100 gal or 0.5 tbls actual*/gal (25% WP)	RESTRICTED USE PESTICIDE. Bark application. Apply late August.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/35101AA	Poplar		
		Refer to Aspen.	
		Refer to Boxelder cluster.	
		Refer to Cottonwood.	
/31284AA	Primrose		
INAMACA	Cucumber beetles (adults and larvae)	1 tsp/gal/50 sq.ft (5% EC)	Soil application. Apply to soil around plant in spring and fall. Formulated with dicofol, carbaryl, and malathion.
INASCWA	Fuller rose beetle (adults and larvae)	4 tsp/gal/35 sq.ft (5% EC)	Soil application. Apply to soil around plants. Formulated with dicofol, methoxychlor, and malathion.
INASCTC	Otiorhynchus weevils (larvae)		
INASCQA	Strawberry root weevil		
INAVAAA	Wireworms		
/34058AA	Pyracantha		
IQAXAAA	Lace bugs	0.3-0.5 lb/A (1% D) or 0.375 lb/100 gal (25% WP) or 0.25 tbls actual*/gal (25% WP) or 0.3 lb/100 gal or 0.05 oz**/gal (1.65 lb/gal EC) or 3 pt 10% EC/100 gal or 3 tsp 10% EC/gal (10% EC)	RESTRICTED USE PESTICIDE. Foliar application. Apply when pests first appear and repeat as needed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Pyracantha (continued)		
		2.5 pt 12.8% EC/100 gal or 1 tbls 12.8% EC/gal (12.8% EC)	
/34118AA	Rhododendron Hybrids/Cultivars		
IQAXAAA	Lace bugs	0.3-0.5 lb/A (1% D) or 0.25-0.375 lb/100 gal (25% WP) or 0.25 tbls actual*/gal (25% WP) or 0.3 lb/100 gal or 0.05 oz**/gal (1.65 lb/gal EC) or 3 pt 10% EC/ 100 gal or 3 tsp 10% EC/gal (10% EC)	RESTRICTED USE PESTICIDE. Foliar application. Apply just after hatching and when small nymphs first appear. Repeat in 10 days or as needed. This will usually be about May 15 and at 30 day intervals.
		2.5 pt 12.8% EC/100 gal or 1 tbls 12.8% EC/gal (12.8% EC)	Foliar application. Apply in spring when nymphs first appear and repeat as needed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Rhododendron Hybrids/Cultivars (continued)		
ITBQANA	Rhododendron borer	0.1 oz**/gal (1.63, 1.65 lb/gal EC) or 0.6 lb/100 gal (1.65 lb/gal EC) or 5 tsp 12.5% EC/gal (12.5% EC) or 3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Make 2 to 3 applications at 7 to 10 day intervals in May and early June. Apply to trunk and lower limbs, particularly to injured areas and old borer wounds.
		4-4.5 tbls 5% EC/gal (5% EC) or 5 pt 12.8% EC/100 gal or 5 tsp 12.8% EC/gal (12.8% EC) or 1 tbls 20% EC/gal (20% EC)	Bark application. Make 2 to 3 applications at 7 to 10 day intervals in May and early June.

Refer to Camellia for additional information.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/34120AA	**Rose**		
ISASAAA	Ants	0.02 oz/100 sq.ft (1% D) or -- (1% D) (1% WP/D) or 0.24 lb/100 gal/A or 0.15 tbls actual*/gal (3% WP) or 0.09 oz/gal (9% WP) or 0.05-0.08 tbls actual*/gal (1% WP/D)	Foliar application. Repeat as needed. Formulated with one or a combination of: basic copper sulfate, dicofol, mancozeb, zineb, methoxychlor, dinocap, carbaryl, and sulfur.
IRACAAA	Aphids		
INAMACA	Cucumber beetles		
INAMBIA	Diabrotica beetles		
INAMADA	Flea beetles		
INASCWA	Fuller rose beetle		
IVABAAA	Grasshoppers		
INBPAZA	Japanese beetle		
IRAFAAA	Leafhoppers (including rose leafhopper)		
IQAMAAA	Plant bugs (including tarnished plant bug)		
INBPAUA	Rose chafer		
INAMCLA	Rose leaf beetle		
IMOAAAA	Thrips		
INAHALA	Flatheaded appletree borer	3 pt 20% EC/100 gal or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bark application. Apply at 21 day intervals from June to August.
/35113AA	**Scotch Pine**	Refer to Austrian Pine.	
/35126AA	**White Pine**	Refer to Japanese Black Pine.	
/35116AA	**Spruce** (including Norway Spruce and White Spruce)		
IRACAAA	Aphids	0.25 lb/100 gal (25% WP)	RESTRICTED USE PESTICIDE. Foliar application. Apply when new growth is about 2 inches long, before leaves curl. Repeat as needed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Spruce (including Norway Spruce and White Spruce) (continued)		
INBQAAA	Bark beetles	0.7 oz/gal (1.7 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Spray trunks and branches of growing trees June 1 and again about August 1.
IRAVACA	Spruce gall adelgids (including cooley spruce gall adelgid)	0.3-0.4 lb/100 gal or 0.05 oz**/gal (1.7 lb/gal EC) (20% EC)***	RESTRICTED USE PESTICIDE. Delayed dormant application. Apply April 1 to 15 before bud swell and again in early May when temperatures increase and before the white cottony egg masses appear. Avoid spraying trees when there is a danger of freezing before spray has dried on tree. Use a spreader sticker.
INASDBA	White pine weevil	0.1 oz**/gal (1.63 lb/gal EC) or 5 tsp 12.5% EC/gal (12.5% EC) or 3-4 pt 20% EC/100 gal or 1-1.33 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Delayed dormant application. Apply thoroughly to entire tree covering terminals. In Northeastern United States apply in late April when buds swell. Consult your State Agricultural Extension Service for timing in other areas.
		4.5 tbls 5% EC/gal (5% EC) or 1 tbls 20% EC/gal (20% EC)	Delayed dormant application. Apply thoroughly to entire tree in late April when buds swell.
/35119AA	Sycamore		
		Refer to Beech.	
		Refer to Boxelder cluster.	
		Refer to Hawthorne.	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/31205DA /31111AA /31111DA	**Tulips**		
IRACAAA	Aphids	0.1 lb/40 gal (6% WP) (1.63 lb/gal EC) or 1 pt 10.68% EC/40 gal (10.68% EC) or 2.4 tsp 10.68% EC/gal (10.68% EC) or 5 tsp 12.5% EC/gal (12.5% EC) or 1 tbls 20% EC/gal (20% EC)	RESTRICTED USE PESTICIDE. Bulb application. Apply as a spray when pests first appear and repeat as needed.
IOBJAFA	Bulb flies		
ITBMCCA	European corn borer		
ITBCBUA	Iris borer		
IMOAAAA	Thrips		
/35128AA	**Willow**		
		Refer to Aspen. Refer to Beech. Refer to Boxelder cluster. Refer to Cottonwood.	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	GREENHOUSE FOOD CROP		
	(Agricultural Crops)		
/10010CA /11005CA /13020CA	Cucumber Tomato		3 ppm 1 day preharvest interval through 1.5 ounces per 50,000 cubic feet for fog application to greenhouse grown plants.
IRACAAA	Aphids	1.5 oz/50,000 cu.ft (2.3%, 5.6%, 11.2% Impr)	Fog application to greenhouse grown plants. Place fumigators in single row on the central walk. Space evenly for uniform distribution of smoke. Close all ventilators, doors, and other openings. Starting with fumigator at farthest end of greenhouse away from exit, light sparkler at handle end and insert into top half inch of contents. Proceed to next fumigator until last fumigator is ignited and evacuate building. Allow greenhouse to remain closed for a minimum of 4 hours. Thoroughly ventilate before reentry. Ventilate gradually, preferrably within 8 hours, especially when plants are in bloom or when growth is unusually soft. Cloudy day, late afternoon, or night fumigations at 60 to 80 F (15.5 to 26.7 C) is optimal. Avoid fumigation when windy or in the presence of excessive moisture. Repeat as needed. Do not remain in greenhouse during fumigation without wearing a full-face gas mask of a type passed by United States Department of Agriculture for lindane protection and protective clothing to minimize the danger of absorption of vaporized material through skin.
IVABAAA	Grasshoppers		
ITAALJ	Leaftiers (adults)		
IRABAAJ	Whiteflies (adults)		
/13020CA	Lettuce		3 ppm 5 day preharvest interval through 1.5 ounces per 50,000 cubic feet for fog application to greenhouse grown plants.

Refer to Cucumber cluster.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Tomato		See Cucumber cluster.
	GREENHOUSE NON-FOOD CROP		
	(Ornamental Plants and Forest Trees)		
/32000CA	Ornamental Plants (including Azalea, Camellia, Carnation, Chrysanthemum, Gardenia, Geranium, Gladiolus, Primrose, Rhododendron, Rose, and Snapdragon)		
IRACAAA	Aphids	1.5 oz/50,000 cu.ft (2.3%, 5.6%, 11.2% Impr)	Fog application to greenhouse grown plants. Place fumigators in single row on the central walk. Space evenly for uniform distribution of smoke. Close all ventilators, doors, and other openings. Starting with fumigator at farthest end of greenhouse away from exit, light sparkler at handle end and insert into top half inch of contents. Proceed to next fumigator until last fumigator is ignited and evacuate building. Allow greenhouse to remain closed for a minimum of 4 hours. Thoroughly ventilate before reentry. Ventilate gradually, preferrably within 8 hours, especially when plants are in bloom or when growth is unusually soft. Cut wide open blooms before fumigation. Cloudy day, late afternoon, or night fumigations at 60 to 80 F (15.5 to 26.7 C) is optimal. Avoid fumigation when windy or in the presence of excessive moisture. Repeat as needed. Do not remain in greenhouse during fumigation without wearing a full-face gas mask of a type passed by United States Department of Agriculture for lindane protection and protective clothing to minimize the danger of absorption of vaporized material through skin.
ITBCCFA	Armyworm		
INAMBIA	Diabrotica beetles		
INAMADA	Flea beetles (including larvae)		
IVABAAA	Grasshoppers		
IQAXAAA	Lace bugs		
IMAAAGA	Leafminers (including chrysanthemum leafminer)		
IMAAAEA	Leafrollers		
ITAAALJ	Leaftiers (adults)		
ITAAAOA	Loopers (including cabbage looper)		
IQAMAAA	Plant bugs (including tarnished plant bug)		
IRAXAPA	Psyllas		
IMOAAAA	Thrips		
IRABAAA	Whiteflies		

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
Ornamental Plants (continued)		
	0.2 lb/100 gal (1.7 lb/gal EC) or 1 pt 20% EC/100 gal or 1 tsp 20% EC/gal (20% EC) or 6 fl.oz 30%, 40% FlC/100 gal (30%, 40% FlC)	RESTRICTED USE PESTICIDE. Application to greenhouse grown plants. Repeat as needed.
	2.5 pt 10% EC/100 gal or 1 tbls 10% EC/gal (10% EC) or 0.25 pt 40% EC/100 gal (40% EC)	Application to greenhouse grown plants. Repeat at 7 to 10 day intervals or as needed.
	16 fl.oz 2% RTU/50,000 cu.ft (2% RTU)	Fog application to greenhouse grown plants. Close all doors, windows, and ventilators. Lock or barricade all entrances, post warning signs, and take precautions to prevent entry to the treated area. Turn off all misting systems. Be certain all blossoms and foliage are dry. A room temperature of 70 to 85 F (21.1 to 29.4 C) is optimal. Wear a full-faced gas mask with canister type recommended by the United States Department of Agriculture for phosphate insecticide protection. Open the metering valve on the applicator to the Number 4 setting on the dial. Eight ounces of liquid will be fogged per minute with a median diameter size of 5 microns. Start the

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
Ornamental Plants (continued)		
		pulsating jet engine of the applicator and allow it to run 1 full minute before opening the insecticide valve. Walk backward down the entire length of the center aisle of the greenhouse, directing the fog over plants. Sway the machine back and forth, blanketing 2 benches from each side of aisle. Keep the nozzle a minimum of 4 feet from the plants. The applicator should constantly be moving so as to cover the entire area as uniformly as possible. Do not over-apply to the point where the foliage is visibly wet. Where bench chrysanthemum, rose and other plants of such height where it is difficult to fog over the plants without wetting the foliage, direct the fog under the benches. Sway the machine back and forth, occasionally pointing the nozzle upward where possible. Repeat as needed. Allow a 1.5 hour exposure period. Thoroughly ventilate, at least 1 hour, before reentry. Damage may result with longer exposure periods.
	16.67 fl.oz 5% RTU/ 50,000 cu.ft (5% RTU)	Fog application to greenhouse grown plants. Applicators must wear the following protective clothing during the application process: a light-weight protective suit or coveralls; water-resistant hat; unlined, waterproof gloves; and unlined, light-weight boots. Applicators must wear a pesticide respirator jointly approved by the Mine Safety and Health Administration and by the National Institute for Occupational Safety and Health under the provisions of 30 CFR Part 11. Close all windows, doors, and ventilators. Take all precautions necessary to prevent unprotected per-

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Plants (continued)		
			sons from entering the treated area. To avoid damage to plants, do not fog greenhouses when the inside temperature exceeds 80 F (26.7 C) or under conditions of high humidity or when blossoms or foliage are wet. Adjust the metering valve or orifice size in the formulation line to produce a dry fog. Never apply a wet fog. A flow rate of 8 fluid ounces per minute is optimal. Start fogging at 1 end of the greenhouse and walk down the center aisle continuously moving away from the fog. Do not over-apply to the point where foliage is visibly wet. The greenhouse should remain closed for 1.5 hours after fogging. Formulated with malathion.
	FORESTRY		
	(Ornamental Plants and Forest Trees)		
/30090AA	Forest Trees		Do not apply during rainfall or on wet bark.
INBQAZA INBQBZA INBQBAA	Black turpentine beetle Pine beetles Red turpentine beetle	1.1-1.2 oz**/ gal diesel oil (1, 1.6 lb/ gal EC)	RESTRICTED USE PESTICIDE. Bark application. Apply to the basal 18 inches of the trunk, higher if infestation is present. Allow spray to run freely down the bark, using small droplet spray (not mist) after loose bark is sloughed off. Also spray stumps as a precaution. Spray is residual for approximately 3 months.
INBQBIA INBQAOA	Pine engraver Southern pine beetle	1.8 lb/100 gal light petroleum oil (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Cut and remove or spray high risk or beetle infested trees. Burn or spray tops. Observe fire damaged trees regularly. If inner bark has turned brown, salvage the tree at once. Apply to trunk, tops, and stumps as a medium

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Forest Trees (continued)		
			fine spray to the point of runoff. A mist spray is not desirable. Do not apply on wet bark. Spray is residual for approximately 3 months.
/30059AA	**Pine** (Forest)		
INBQAZA INBQBAA	Black turpentine beetle Red turpentine beetle	0.5 oz/gal no. 2 fuel oil or 1 oz/gal no. 2 fuel oil (1 lb/gal EC)	RESTRICTED USE PESTICIDE. Bark application. Apply lower rate as a preventative spray and higher rate for control of existing infestations. Apply to the bark surface of the trunk up to a height of 6 feet. On uninfested trees to prevent infestation, apply only to the basal 30 inches of trunk. Slough off loose or flaky bark and debris before application. Use a cone-shaped spray nozzle, producing a coarse spray and high enough pressure to force spray into cracks and crevices of bark. Apply to the point of runoff, approximately 1 gallon of finished spray per 40 to 50 square feet of bark surface. Do not apply more often than once every 6 months.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	DOMESTIC OUTDOOR		
	(Household)		
/630030A	**Domestic Dwellings, Outdoor**		
			Do not allow children or pets in treated area until all spray has dried or material washed in.
ISASAAA	Ants	1-3 tbls 4.6%, 5% EC/gal (4.6%, 5% EC)	Outdoor treatment. Apply to lawns, soil around buildings, foundations, along fences and other areas where pests hide. May be formulated with naled or dicofol, methoxychlor, and malathion.
IQAUACA	Boxelder bug		
ILAWAAA	Chigger mites		
ILAVABA	Clover mite		
INBQABA	Elm bark beetle		
IOAAAAA	Flies		
IOAMAAA	Mosquitoes		
IKAAAAA	Spiders		
ILAAACA	Ticks		
ISASAAA	Ants	0.022 oz/gal (0.36 lb/gal EC) or 3-4 tsp 5% EC/gal [2.85 gal/ 100 sq.ft] (5% EC)	Outdoor treatment. Apply to all pest-hiding places in shrubs, lawns, porches, patios and exterior of homes. May be formulated with dicofol, methoxychlor, and malathion.
ILAWAAA	Chigger mites		
IOAAAAA	Flies		
IOAAAFA	Gnats		
IOAMAAA	Mosquitoes		
ILAAACA	Ticks		
		4 tbls 4.6% EC/gal (4.6% EC)	Outdoor treatment. Apply with a hose end proportioner. Spray all patio surfaces and surrounding areas 1 to 3 hours before starting cookout. Formulated with naled.
ILAWAAA	Chigger mites	0.4-1 lb/100 gal (6%, 25% WP) (1.6, 1.63 lb/gal EC) (10%, 11.14%, 12.5% EC)# or 0.4-0.5 lb/100 gal [40 gal/5,000 sq.ft] (6% WP) or	Application to lawns and vegetation. Apply to weeds, lawns, shrubs, and underbrush harbouring pests. Repeat as needed. Do not apply to food crops.
ILAAACA	Ticks		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Domestic Dwellings, Outdoor (continued)		
		0.1-0.125 lb/ 5,000 sq.ft (1% D) (25% WP) or 0.23 lb/5,000 sq.ft (6% WP)	
/630030A	Military Buildings, Outdoor		
IMNAAAA	Fleas	0.05 lb/5,000 sq.ft (1% D)	Use limited to military personnel. Outdoor treatment.
	INDOOR		
	(Processed or Manufactured Products, and Food or Feed Containers or Dispensers)		
	General Warnings and Limitations:		Observe respirator precaution.
/460280A	Food/Feed Storage Areas - Empty		
ITAMASA	Angoumois grain moth	0.5% spray (25% WP) or 1.25 gal 0.5% RTU/1,000 sq.ft [spray] or 1 gal 0.5% RTU/10,000 sq.ft [fog] (0.5% RTU)	Residual spray or fog application to empty storage areas. Apply to the point of runoff by continuous mechanical fogging, power, or hand-spraying. Stir the exposed stages to increase mobile activity. A coarse spray will soak walls, or sides of bins, tanks, and jack-walls. A heavy dense fog will penetrate cracks, crevices, and coat ledges, joints, guys, cross-beams, pillars, columns, trusses, walls, overheads, and bulkheads. Clean areas thoroughly prior to application. Use in conjunction with grain bin fumigation. Formulated with methoxychlor.
INBVACA	Cadelle		
INATAFA	Carpet beetle		
INBUATA	Confused flour beetle		
INASDQA	Granary weevil		
ITBMCHA	Indianmeal moth		
INAEAEA	Lesser grain borer		
INBUASA	Red flour beetle		
INASDRA	Rice weevil		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/460150A	Grain/Cereal/Flour Bins Feed/Food - Empty		
ITAMASA	Angoumois grain moth	0.5% spray (25% WP) or 0.5% spray [1-2 gal/ 1,000 sq.ft] (1.65 lb/gal EC) (20% EC)	Empty bin spray. Clean bin prior to spraying. Apply to places where insects hide and breed, paying particular attention to cracks and crevices in walls, windows, doors, floors and empty bins. Use in conjunction with grain fumigation. Apply prior to bin filling.
INAGABA	Bean weevil		
INATAHA	Black carpet beetle		
IVAAABA	Cockroaches		
INBUATA	Confused flour beetle		
IOAAAAA	Flies		
INASDQA	Granary weevil		
ITBMCHA	Indianmeal moth		
INASDRA	Rice weevil		
INARAGA	Sawtoothed grain beetle		
IMPBACA	Silverfish		
	(Pets and Domestic Animals) (Animals and Their Man-Made Premises)		
/53001IA	Beef Cattle		7 ppm (fat of meat) 30 day pre-slaughter interval through 0.06 percent spray. 60 day pre-slaughter interval through 0.06 percent dip. RESTRICTED USE PESTICIDE. Do not treat animals under 3 months of age. Young animals between 3 and 6 months of age may not be treated with concentrations greater than 0.03 percent. Do not treat sows within 14 days of farrowing nor for a minimum of 21 days thereafter. Do not treat animals in cold, stormy weather. Do not treat overheated or sick animals. Make sure animals are well watered prior to being dipped to prevent them from drinking the treated dip. When spraying use a sprayer capable of maintaining pressure of 200 to 400 pounds per square inch. Use 1 to 2 gallons of spray per head for cattle and horses and proportionally less for smaller animals. For pressurized sprays hold can 4 to 8 inches from area to be treated. Release spray for 3 to 10 seconds per wound or infestation mass.
/53002IA	Goats		
/53006IA	Hogs		
/53005IA	Sheep		
/53003IA			

Beef Cattle cluster (continued)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
IQALABA	Chorioptic mange mite complex	0.023-0.06% [dip or spray] (6%, 25% WP) (1%, 25% WP/D) (1, 1.6, 1.63, 1.65, 1.75 lb/gal EC) (2%, 6.5%, 10%, 10.68%, 11%, 11.14%, 12.5%, 20% EC) (1% FlC)	Animal dip or spray treatment. Thoroughly wet the animal. For chorioptic manage mite complex, itch mite family and the scab mite family make 2 applications at 7 to 14 day intervals. If spray treatment is used, spray thoroughly to get under the scabs. Animals' quarters should also be sprayed. For sheep ked, when spraying, spray along the back, around the ears, and spray against the wool. Spray in the fall. In some areas a repeat spraying may be needed after shearing. For stable fly this treatment is supplemental and should be accompanied by premise treatments. For other pests apply when pests appear and repeat at a minimum of 3 day intervals.
IMNAAAA	Fleas		
IOAUADA	Horn fly		
ILASAAA	Itch mite family		
IMAAADA	Lice		
IOAMAAA	Mosquitoes		
ILAQAAA	Scab mite family		
IOATABA	Sheep ked (on sheep and goats)		
IOAUAHA	(Stable fly)		
ILAAACA	Ticks		
IMNAAAA	Fleas	-- (0.5%, 1% D) (1% WP/D)	Animal dust treatment. Dust thoroughly and rub dust into the hair coat. Repeat at 14 to 30 day intervals. May be used during winter when a spray is not advised. Application is supplemental to premises treatment. May be formulated with methoxychlor and sulfur.
ILASAAA	Itch mite family		
IMAAADA	Lice		
IOATABA	Sheep ked (on sheep and goats)		
ILAAACA	Ticks		
ILACADA	Ear tick	pressurized spray (3% PrL)	Animal spray treatment. Thoroughly spray all the inner surfaces of the ear. Use enough spray to wet the skin and allow a little to run in the ear. Release spray for 3 seconds per ear when treating cattle and 2 seconds per ear when treating smaller animals. Massage to insure complete coverage. Spray must come in contact with pest. Repeat as needed.

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Beef Cattle cluster (continued)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
IOAGABA	Fleeceworms/wool maggots/wound maggots (on sheep and goats)	pressurized spray (3% PrL)	Animal spray treatment. Spray directly on infested areas and to a distance of 2 or 3 inches outside the infestation. Repeat treatment 2 times every 7 days until infestation is controlled.
IOAGADA	Screwworm	pressurized spray (3% PrL)	Animal spray treatment of screwworm infestations in superficial cuts or wounds. Spray directly into and 1 inch around infested wounds. Also spray drainage area below the wound. Repeat treatment 2 times every 7 days until wound heals.
			Animal spray treatment for protection against screwworm. Spray all superficial wounds such as wire cuts and shear cuts and after docking, dehorning, or castrating. Repeat treatment 2 times every 7 days until wound heals.
/53001IA /53002IA /53005IA	(Beef Cattle) (Goats) (Sheep)		
ILASAAA ILAQAAA	Itch mite family Scab mite family	1.25 gal 0.45%, 1.96%, 2.5% EC/100 gal (0.45%, 1.96%, 2.5% EC)	Animal dip or spray treatment. When dipping allow a minimum of 30 seconds per animal dunking their heads a minimum of 2 times. Formulated with toxaphene.
		0.83 gal 0.45%, 1.96%, 2.5% EC/100 gal (0.45% 1.96%, 2.5% EC)	Dip replenishment. Maintain a premixed emulsion in a clean 30 to 55 gallon overhead drum. Formulated with toxaphene.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Beef Cattle cluster (continued)		
/53001IA	(Beef Cattle)		
/53005IA	(Sheep)		
ILASADA	Itch mite	1.11 gal 1% EC/100 gal (1% EC) or 1.33 gal 2% EC/100 gal (2% EC)	Animal dip or spray treatment. When dipping allow a minimum of 30 seconds per animal and submerge each animal 2 times. When spraying use approximately 3 quarts of finished spray per head for beef cattle and proportionally less for sheep. Repeat in 21 days if reinfestation occurs. Formulated with toxaphene.
/53001IA	(Beef Cattle)		
/53006IA	(Hogs)		
ILASAAA	Itch mite family	Dust bag (1% D)	Animal dust bag treatment.
IMAAADA	Lice		
ILAAACA	Ticks		
IMAAADA	Lice	0.2% solution mixed with no. 2 fuel oil [1 gal/10-20 linear ft of back rubber] (1.63 lb/gal EC)	Animal back rubber treatment. Treat burlap wrapped cable at 21 to 28 day intervals. Do not make back rubber accessible to beef cattle within 30 days of slaughter or animals under 6 months of age.
		0.2% RTU (0.2% RTU)	Hog oiler or rubbing post treatment. Pour on a post wrapped with rope or burlap.
IQALABA	Chorioptic mange mite complex	0.25-0.5 tbls actual*/gal (25% WP)	Animal sponge treatment. Sponge infected areas. Use 1 tablespoon 25 percent wettable powder for young calves 3 to 6 months old. Repeat at 7 to 10 day intervals.
ILASAAA	Itch mite family		
ILACADA	Ear tick	10 fl.oz 30%, 40% FlC/100 gal (30%, 40% FlC)	Animal dip or spray treatment.
IOAUADA	Horn fly		
IOAGADA	Screwworm		
ILAAACA	Ticks		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/54003IA	**Dogs**		RESTRICTED USE PESTICIDE. Do not treat animals within 30 days prior to giving birth to young. Do not treat nursing animals. Do not treat dogs less than 4 months old.
ILASAAA	Itch mite family	0.032-0.046 oz/gal (6% WP) (1.65 lb/gal EC) or 0.1-0.25 tbls actual*/gal (6.5%, 8.82%, 10.94%, 12.2%, 12.89%, 20% EC)	Animal treatment. Apply as a spray, dip, or using a sponge or brush. Thoroughly wet the dog with the dilution making sure that mange scabs and lesions are penetrated. Allow the dog to dry in a warm place without rinsing or toweling. OR MAI Formulated with carbaryl or malathion; pine oil; or pine oil, piperonyl butoxide, technical, pyrethins, and poly(oxyethylene) sorbitol mixed ether ester.
		--OR MAI-- 1.5 fl.oz 0.425% EC/gal (0.425% EC) or 2 fl.oz 2% EC/gal (2% EC) or 8 tsp 3.9% EC/gal (3.9% EC) or 5 tsp 5% EC/gal (5% EC)	
		topical (0.1%, 0.5% RTU)	Animal treatment. Cleanse infected area with antiseptic soap, let dry and gently massage lotion over infected area. If a large area is involved it should be divided into separate areas which are treated alternately every other day. Repeat at 3 to 7 day intervals. May be formulated with benzyl ben-

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Dogs (continued)		
			zoate, rotenone or benzyl benzoate and rotenone.
IMNAAAA ILASAAA IMAAADA ILAAACA	Fleas Itch mite family Lice Ticks	shampoo (0.05%, 0.097%, 0.25%, 0.3% RTU)	Animal treatment. Thoroughly wet the entire hair coat and apply enough shampoo to make a lather. Work thoroughly into the hair coat. Allow the lather to remain in contact with the skin for a minimum of 5 minutes before rinsing. Rinse thoroughly. Repeat as needed, but not more than once every 7 days. May be formulated with potassium tetrathionate or piperonyl butoxide, technical and pyrethrins.
		Refer to Fox for additional use and limitation information.	
/51010IA /54003IA	**Fox**		
IMNAAAA IMAAADA ILAAACA	Fleas Lice Ticks	-- (0.5% D)	Animal dust treatment. Dust powder well into the hair coat, particularly along the back line from the base of the tail to the head. Use in conjunction with premises treatment. May be formulated with methoxychlor, technical and sulfur.
/53003IA	**Horses**		7 ppm (fat of meat) RESTRICTED USE PESTICIDE.
		Refer to Beef Cattle cluster and Mules for use and limitation information.	
/56006IA /53003IA	**Mules**		
IMAAADA	Lice	-- (1% D)	Animal dust treatment. Thoroughly dust the hair coat of the animal, but do not rub in.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Mules (continued)		
IOAGADA	Screwworm	topical (3% RTU)	Animal treatment. Apply using a swab or soft bristle brush. Apply thoroughly to all wounds making sure it covers all blood and exudate in the wound area. Repeat 2 times every 7 days.
	(Animal Premises)		
/54003JA	Dog Kennels		
/51010JA	Fox Hutches		
IMNAAAA	(Fleas)	--	Animal premise treatment. Dust kennels, hutches, bedding or litter. Repeat when necessary. Use limited to population reduction. May be formulated with methoxychlor and sulfur.
IMAAADA	(Lice)	(0.5% D)	
/54003JA	(Dog Kennels)		
ISASAAA	Ants	4 tbls 20% EC/gal (20% EC)	Premises treatment. Apply as a coarse spray to kennel walls, and cracks and crevices.
IVAAABA	Cockroaches		
IMNAAAA	Fleas		
IOAAAAA	Flies		
IMAAADA	Lice	1 part 20% EC/9 parts water (20% EC)	Residual paint. Apply to windows, doors, and other places where pests congregate.
	Mites		
IOAMAAA	Mosquitoes		
ILAAACA	Ticks		
IMNAAAA	Fleas	3 fl.oz 12.89% EC/gal (12.89% EC)	Premix treatment. Saturate surfaces such as houses, fencing, cement runs, and surrounding grounds to the point of runoff.
/890030A	Garbage Dumps (livestock premises)		1 ppm (fat of meat)
/52000KA	Livestock Premises (manure treatment)		Do not apply treated manure to land to be planted to root crops. Use limited to population reduction.
IOAAAAA	Flies	0.125% spray (11.14% EC)	Wet thoroughly every 21 to 28 days or as manure is added.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/53006JA	Hog Pens		1 ppm (fat of meat)
IMNAAAA IMAAADA	(Fleas) (Lice)	0.1 lb/1,000 sq.ft (1% D)	Premise treatment. Remove soiled bedding or litter and apply to the floor or ground area. Provide clean bedding or litter.
		0.05 lb/1,000 sq.ft (1% D)	Premise treatment. Scatter on the bedding occasionally as a preventative measure.
/52000JA /61000JA	Livestock Building and Pens		1 ppm (fat of meat) Do not use in dairy barns or poultry houses. Cover feed and water troughs before spraying or wash thoroughly with a pressure hose before spray deposit dries. Remove animals prior to application.
ISASAAA IQAFAAA IVAAABA IMNAAAA IOAAAAA IOAAAFA IOAKAAA IOAMAAA IMPBACA IKAAAAA ILAAACA	Ants Bed bug complex Cockroaches Fleas Flies (including house fly and stable fly) Gnats Midges Mosquitoes Silverfish Spiders Ticks	0.1-0.3% spray [1-2 gal/1,000 sq.ft] or 0.3-0.5% spray [1 gal/1,000 sq.ft] (6%, 25% WP) (25% WP/D) (1, 1.6, 1.63, 1.75 lb/gal EC) (6.5%, 10%, 10.68%, 11.14%, 12.5%, 20% 40% EC) (20% SC/L) (40% FlC)	Residual premise treatment. For crawling insects thoroughly spray all baseboards, cracks, floors, and other places where pests hide, also spray any pests present. For flying insects apply as a coarse spray to walls, ceilings, beams, screens, window frames, partitions, and similar places where pests congregate. Repeat as needed. Applications may be made to interior or exterior surfaces, adjacent fences, and weedy foliage. Do not allow livestock to graze treated foliage. The 20 percent solution concentrate/liquid is diluted in odorless kerosene.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Livestock Building and Pens (continued)		
		1.25% paint (25% WP) (1.6, 1.63 lb/gal EC) (10.63%, 11.14%, 12.5%, 20% EC)	Residual paint. Apply as a paint around windows, doors, ceiling beams, window screens and on baseboards and in cracks. Repeat as needed. This concentration may blister painted surfaces.
	(Agricultural Premises and Equipment)		
/61000JA	Agricultural Premises		
		Refer to (Pets and Domestic Animals) (Animals and Their Man-Made Premises), Livestock Buildings and Pens for use information.	
	(Household)		
/630070A	Domestic Dwellings, Contents		
IQAFACA	Bed bug	1% spray (20% EC) (1.63 lb/gal SC/L)	Apply lightly but thoroughly to beds, mattresses, and other hiding places about the room. Direct the spray into all cracks and crevices and around baseboards, walls, and floors.
ITBSABA	Clothes moths	0.1% spray (1.63 lb/gal SC/L)	Moth proofing treatment. Apply lightly but thoroughly to infested areas on clothing and bedding. Pay special attention to folds and seams. Repeat at 30 day intervals as needed.
		0.5% spray (20% EC) (1.63 lb/gal SC/L)	Moth proofing treatment. Apply to materials immediately being prepared for storage. Dry clean before using articles.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/630010A	Domestic Dwellings, Indoor		Do not allow children or pets in treated area until all spray has dried.
ISASAAA IVAAABA IOAAAAA ITAAABA IMPBACA	Ants Cockroaches Flies Moths Silverfish	shelfpaper 15-19 mg/ sq.ft (0.27% Impr)	Nonfood areas only. Line drawers, shelves, cabinets, storage areas, particularly those around garbage containers, under sinks, in broom closets, basements, and all secluded damp areas where pests congregate. Leave some paper surface exposed so pests may contact treated paper. Reline a minimum of 2 times per year.
ISASAAA INATAFA IVAAABA IMPBACA IKAAAAA	Ants Carpet beetle Cockroaches (including American and Oriental cockroaches) Silverfish Spiders	dust (0.5% D) or 0.4-0.5% paint or spray (0.5%, 20% EC) (1.63 lb/gal SC/L) or spray (0.5% RTU) or pressurized spray (0.25% PrL)	Indoor treatment. Apply where pests hide contacting as many as possible with dust or spray. For ants apply to ant trails and areas where they enter the house. All door sills, window frames, water pipes, heat ducts, electrical outlets and baseboards. For carpet beetles make a localized application to floor baseboards, into cracks and crevices, and under carpets. For cockroaches apply to cracks and crevices. May be formulated with methoxychlor, naled, or methoxychlor and sulfur, or dicofol, methoxychlor, and malathion.
IOAAAAA IOAAAFA IOAMAAA	Flies Gnats Mosquitoes	0.1% spray (1.63 lb/gal SC/L)	Indoor space spray. Apply with a conventional mist sprayer. Leave area closed for 10 minutes. Ventilate prior to reentry.
		0.5% spray (20% EC) or spray (0.5% RTU) or pressurized spray (25% PrL)	Indoor spray. Apply as a spot spray to wall surfaces, around doors, screens, and areas where pests alight. May be formulated with methoxychlor, or naled.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	(Wood or Wood Structure Protection Treatments)		
/640030A	Finished Wood Products		
IMGCAGA INAAACA IMGCABA	Drywood termites Powderpost beetles Powderpost termites	brush on or spray [1 gal 0.5% 100-200 sq.ft] (0.5% EC)	Nonsoil contact nonfumigation treatment. For wood surfaces that have been painted or varnished. Brush on or apply as a coarse spray and make repeated applications as the chemical is absorbed. If possible locate the exit holes to the termite galleries, enlarge it with a needle or ice pick, and inject into the hole with a pressure oil can or a hypodermic syringe. If possible remove the object to be treated outdoors or treat in a well ventilated room. Leave area closed up for several hours or until the wood has thoroughly absorbed the solution. Formulated with orthodichlorobenzene.
IMAAACA	Wood boring insects	-- (1% RTU) (0.75% PrL)	Nonsoil contact nonfumigation treatment. Treat surfaces or treat flight holes.
/640000A	Terrestrial Structures		RESTRICTED USE PESTICIDE.
INALAAA INBEAAA INBEAAA	Cerambycid beetles Deathwatch beetle family Lyctid beetle	0.5% paint or spray (1, 1.6, 1.63 lb/gal EC) (12.5% EC)	Nonsoil contact wood protection treatment. For small areas brush on infested areas. For large or overhead areas apply as a coarse wet spray but not to the point of runoff. Do not apply as a mist.
INAAACA	Powderpost beetles	1 gal 0.5% RTU/100 sq.ft (0.5% RTU)	Nonsoil contact fumigation treatment. For infestations in joists, sub-floors, and other structural timbers. Spray thoroughly to the point of runoff on lumber 2 inches or less in thickness. Repeat application in 14 to 30 days. If infestation is found in thicker lumber (girders, beams), pressure impregnation of these timbers is required. For infestations in flooring, hardwood paneling or trim apply to the surface, after removal of all wax.

Terrestrial Structures (continued)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
			Ventilate and re-wax after 24 hours. Repeat application in 14 to 30 days. Avoid seepage through floor cracks if floor is laid in asphalt mastic on concrete slabs or laid over tar or asphalt building paper as asphalt bleeding may result.
IMGDAGA	Subterranean termites (including Coptotermis and Reticulitermes spp)	0.8% emulsion (1 lb/gal EC)	Soil contact wood protection treatment. Use limited to professional pest control operators. This formulation is designed for treatment of soil to establish a barrier which is lethal to termites. Lindane must be adequately dispersed in the soil to provide a barrier between the wood in the structure and the termite colonies in the soil or to control termites living in the structure. It is necessary for the effective use of lindane that the service technician be familiar with current control practices including trenching, rodding, subslab injection, and low pressure spray application. These techniques must be correctly employed to prevent or control infestations by subterranean termite species of Heterotermes and Reticutermes. Choice of appropriate procedures includes consideration of such variable factors as the design of the structure, water table, soil type, soil compaction, grade conditions and location and type of domestic water supplies. The biology and behavior of the involved termite species are important factors to be known as well as suspected location of the colony and severity of the infestation within the structure to be protected. For advice concerning current control practices for specific local conditions, consult resources in structural pest control. Annual inspec-

Terrestrial Structures (continued)

tions of the treated area should be made. Retreatment may be necessary if there is an active infestation or if there has been a disruption of the chemical barrier in the soil due to construction, excavations, landscaping, etc. Soil should not be treated when excessively wet. The termites' source of moisture should be eliminated by providing a chemical barrier and/or repairing faulty construction. Contamination of public and private water supplies must be avoided by following these precautions: Use antiback-flow equipment or procedures to prevent syphonage of pesticide back into water supplies. Do not treat soil that is water saturated or frozen. Consult state and local specifications for recommended distances of treatment areas from wells, and refer to Federal Housing Administration (F.H.A.) Specifications for further guidance. All nonessential wood and cellulose containing materials, including scrap wood and form boards, should be removed from around foundation walls, crawl spaces, and porches.

PRECONSTRUCTION SUBTERRANEAN TERMITE TREATMENT
Effective preconstruction subterranean termite control requires the establishment of an unbroken vertical and/or horizontal chemical barrier between wood in the structure and the termite colonies in the soil. To meet F.H.A. termite proofing requirements, follow the latest edition of the Housing and Urban Development (H.U.D.) Minimum Property Standards. After grading is completed and prior to the pouring of the slab, slab supported/constructed porches, or entrance platforms, make the following treatments. Applica-

Terrestrial Structures (continued)

tions shall be made by a low pressure spray for horizontal barriers over areas intended for covering floors, porches, and other critical areas. Establish a vertical barrier in areas such as around the base of foundations, plumbing, back-filled soil against foundation walls, and other critical areas.

1. Where it is necessary to produce a horizontal barrier, apply the emulsion at the rate of 1 gallon of 0.8 percent emulsion per 10 square feet to dirt fill. If fill is washed gravel or other coarse material, apply at 1.5 gallons of 0.8 percent emulsion per 10 square feet. It is important that the emulsion reaches the soil substrate.
   a. If concrete slabs cannot be poured over soil the same day it has been treated, a waterproof cover, such as polyethylene sheeting, should be placed over the soil. This is not necessary if foundation walls have been installed around the treated soil.
2. To produce a vertical barrier, apply the emulsion at the rate of 4 gallons of 0.8 percent emulsion per 10 linear feet per foot of depth.
   a. Rodding and/or trenching applications should not be made below the top of the footing.
   b. Trench need not be wider than 6 inches.
   c. Rod holes should extend from the base of the trench to the top of the footing, and should be spaced (about 1 foot) to provide a continuous barrier.

Terrestrial Structures (continued)

- d. Emulsion should be mixed with the soil as it is being replaced in the trench. Cover treated soil with a layer of untreated soil.

3. Hollow block foundations or voids of masonry should be treated to make a continuous chemical barrier in voids. Apply at the rate of 2 gallons of 0.8 percent emulsion per 10 linear feet so it will reach the footing.
4. For crawl spaces apply at the rate of 4 gallons of 0.8 percent emulsion per 10 linear feet per foot of depth from grade to bottom of foundations. Application may be made by rodding, low pressure spray, and/or trenching. Treat both sides of foundation and around all piers and pipes.
   - a. Rod holes should be spaced (about 1 foot) to provide a continuous chemical barrier.
   - b. Trench need not be wider than 6 inches nor below the foundation. The emulsion should be mixed with the soil as it is being replaced in the trench. Cover the treated soil with a layer of untreated soil.
   - c. Do not apply in any manner to an area intended as a plenum air space.
   - d. Do not apply as an overall treatment to soil in crawl spaces.

All holes drilled in construction elements for treatment should be securely plugged.

POSTCONSTRUCTION TREATMENTS

Postconstruction applications shall be made by injection, rodding, low pressure spray, and/or trenching.

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations

Terrestrial Structures (continued)

Do not apply emulsion until location of heat or air conditioning ducts, vents, water and sewer lines, or electrical conduits are known and identified. Extreme caution must be taken to avoid contamination of these structural elements and airways. Do not apply in any manner to an area intended as a plenum air space.

1. For slab-on-ground construction apply at the rate of 4 gallons of 0.8 percent emulsion per 10 linear feet. Application may be made by subslab injection. Injectors should not extend beyond the tops of the footings. Treat along the outside of the foundation and where necessary on the inside of foundation walls. Treatment may also be required along 1 side of interior partitions and along all cracks and expansion joints.
    a. Drill holes in the slab to provide a continuous chemical barrier.
    b. Where necessary, drill through the foundation walls from the outside and force the emulsion just beneath the slab or along all the cracks and expansion joints and other critical areas.
    c. For shallow foundations, 1 foot or less, dig a narrow trench approximately 6 inches wide along the outside of the foundation walls. Do not dig below the bottom of the foundation. The emulsion should be applied to the trench and the soil at the rate of 4 gallons of 0.8 percent emulsion per 10 linear feet as the soil is replaced in the trench.

Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations

Terrestrial Structures (continued)

Cover the treated soil with a layer of untreated soil.

d. For foundations deeper than 1 foot follow rates for basements.

2. Hollow block foundations or voids of masonry should be treated to make a continuous chemical barrier in voids. Apply at the rate of 2 gallons of 0.8 percent emulsion per 10 linear feet.
3. For basements apply at the rate of 4 gallons of 0.8 percent emulsion per 10 linear feet. Where footings are greater than 1 foot of depth from the grade to the bottom of the foundation, application may be made by trenching and/or rodding. Treat outside of foundation walls, and if necessary along inside of foundation walls, along cracks in basement floors, along interior load bearing walls, around sewer pipes, conduits, and piers.
4. In crawl spaces apply at the rate of 4 gallons of 1 percent emulsion per 10 linear feet per foot of depth from grade to bottom of foundation. Application may be made by rodding, and/or trenching. Treat both sides of foundation and around all piers and pipes.
   a. Rod holes should be spaced (about 1 foot) to provide a continuous chemical barrier.
   b. Trench need not be wider than 6 inches nor below the foundations. The emulsion should be mixed with the soil as it is replaced in the trench. Cover the treated soil with a layer of untreated soil.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Terrestrial Structures (continued)		c. Do not apply in any manner to an area intended as a plenum air space. After treatment, securely plug all holes drilled in construction elements. d. Do not apply as an overall treatment to soil in crawl spaces. All holes drilled in construction elements for treatment should be securely plugged. Label claims it will provide residual control of subterranean termites for a minimum of 5 years when used properly.
IMGAAAA	Termites (swarm prevention)	4 lb 14.64% RTU/1,000 sq.ft (14.64% RTU)	Soil contact nonfumigation treatment. Through holes drilled in concrete slabs inject 45 to 60 days before regular swarming season begins. Immediately plug holes with concrete or brass caps. Formulated with 1,2,4-trichlorobenzene.
/640010A	**Unseasoned Forest Products**		RESTRICTED USE PESTICIDE.
INAAABA	Ambrosia beetles	3.6 gal 11.34%, 11.37% EC/ 100 gal water, kerosene, diesel fuel, no. 2 fuel oil [1 gal/100 sq.ft of log surface] (11.34%, 11.37% EC)	Nonsoil contact nonfumigation treatment. Spray promptly after the trees have been felled and bucked. Thoroughly wet all log surfaces, bark, and ends. May be tank mixed with pentachlorophenol.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Unseasoned Forest Products (continued)		
		0.625 gal 11.34% EC/100 gal anti stain mixture (11.34% EC) or 1 gal 11.37% EC/100 gal dipping or anti stain mixture (11.37% EC)	Nonsoil contact nonfumigation treatment. Log and lumber dips.
		1.33 gal 6.63% EC/100 gal water [8-10 gal/1,000 board ft] (6.63% EC)	Nonsoil contact nonfumigation treatment. For dipping rough sawn lumber dried according to industry standards. Treat within 24 hours of cutting. Formulated with tetrachlorophenol and other chlorophenols.
		3.57 gal 11.34% EC/100 gal water, kerosene, diesel fuel, no. 2 fuel oil [0.375-0.5 gal/1,000 board ft of 1 inch lumber] (11.34% EC)	Nonsoil contact nonfumigation treatment. Lumber may be sprayed prior to stacking or after the lumber is in the seasoning stacks. When spraying stacked lumber apply with a high pressure spraying equipment equipped with a nozzle that produces a fine mist. Direct the spray so that the mist gets into all air spaces between lumber in the stack.
INAAABA INALAQA	Ambrosia beetles Sawyers	2-5 gal 6.63% EC/100 gal water [8-10 gal/1,000 board ft] (6.63% EC)	Nonsoil contact nonfumigation treatment. Spray treatment for prolonged exposure, very susceptible wood species, or severe conditions, as in tropical areas. Formulated with tetrachlorophenol and other chlorophenols.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Unseasoned Forest Products (continued)		
		5.88 gal 6.63% EC/100 gal water (6.63% EC)	Nonsoil contact fumigation treatment. Spray treatment for longer residual control. Formulated with tetrachlorophenol and other chlorophenols.
INBQAAA	Bark beetles	1.79 gal 11.34% EC/ 100 gal diesel fuel or no. 2 fuel oil [1 gal/100 sq.ft of log surface] (11.34% EC)	Nonsoil contact nonfumigation treatment. Spray treatment. Thoroughly wet all log surfaces and log ends.
INBEAFA	Lyctus beetles	4 gal 11.37% EC/100 gal dipping mixture (11.37% EC)	Nonsoil contact nonfumigation treatment. Log and lumber dip.
INALAQA	Sawyers	2.7 gal 6.63% EC/100 gal water [8-10 gal/ 1,000 board ft of lumber] (6.63% EC)	Nonsoil contact nonfumigation treatment. For dipping rough sawn lumber dried according to industry standards. Treat within 24 hours of cutting. Formulated with tetrachlorophenol and other chlorophenols.
	(Noncrop, Wide Area, and General Indoor/Outdoor Treatments)		
/680000A	**Wide Area General Indoor/Outdoor Treatments**		
IVAAABA	Cockroaches	1 gal 1.68% EC/4 gal water, fuel oil or other suitable solvent (1.68% EC)	Application for municipal reduction of cockroach populations. Thoroughly wet the insides of manholes and sewage lines. Treat garbage racks, and garbage cans found in alleys between buildings. Apply as a coarse spray and wet garbage dumps and refuse areas. Repeat as needed. Formulated with vapona.

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Wide Area General Indoor/Outdoor Treatments (continued)		
IMNAAAA	Fleas	0.4 lb/A (1% D)	Use limited to military personnel. Outdoor treatment.
IOAAAAA IOAMAAA IOBCAAA	Flies Mosquitoes Moth flies	0.4% spray [5-10 gal/A] (1 lb/gal EC) (25% EC)	Outdoor treatment. For temporary control around camp sites and bivouac areas. Apply lightly to vegetation, tree trunks, and other surfaces.
ILAWAAA IMNAAAA ILAAACA	Chigger mites Fleas Ticks	0.4% spray [10-20 gal/A] (1 lb/gal EC) (25% EC)	Outdoor treatment. For mites and ticks, apply per acre rate depending on amount of vegetation and litter. For flea control apply at the same rate to infested grounds and under buildings.
IOAAAAA IOAMAAA	(Flies) (Mosquitoes)	1 gal 1.68% EC/15 gal water or fuel oil (1.68% EC)	Outdoor application. Apply so that the residual deposit will aid in the control of flies and mosquitoes. Thoroughly wet the surfaces where pests alight such as garbage dumps, refuse heaps, outside of barns and buildings and undergrowth near stagnant water. Formulated with vapona.
IOAMAAA	Mosquitoes	ULV undiluted at 0.5 gal 1.68% EC/A (1.68% EC)	Ultra low volume. Outdoor application. Apply with electronic fogging equipment. Do not apply where food or feed crops are growing. Formulated with vapona.
	(Commercial and Industrial Uses)		
/77000JC	**Commercial Establishments**		
ISASAAA IQAUACA IVAAABA IOAAAAA IOAAAFA IOAMAAA IOBCAAA	Ants Boxelder bug Cockroaches Flies Gnats Mosquitoes Moth flies	0.3% spray or 0.5% spray [1.33-2 gal/1,000 sq.ft] (1 lb/gal EC) (1.63 lb/gal SC/L) (11.14% EC) or	Use limited to professional pest control operators. Indoor residual spray. Apply the 0.5 percent spray for a longer residual control. For crawling insects apply as a spot spray to cracks, crevices, and other places where pests hide. For flying insects limit application to areas where those pests gather such as around windows, doors, and light fixtures. Do not apply as a mist spray.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Commercial Establishments (continued)		
		0.3% spray in odorless kerosene (20% SC/L)	May be formulated with methyl carbitol (diethylene glycol monomethyl ether).
ISASAAA IVAAABA IMPBACA IKAAAAA	Ants Cockroaches Silverfish Spiders	0.4% spray (1.63 lb/gal SC/L)	Indoor residual treatment. Apply as a coarse wetting spray into cracks and crevices contacting as many insects as possible. Repeat as needed.
IOAAAAA IOAAAFA IOAMAAA	Flies Gnats Mosquitoes	0.1% spray (1.63 lb/gal SC/L)	Indoor space spray treatment. Apply with a conventional mist sprayer. Prior to spraying extinguish all open flames and close up area. Leave area closed for 10 minutes. Ventilate prior to reentry.
	(Domestic and Human Use)		
/860010A	Human Bedding, Blankets, Mattresses		
/860030A	Human Clothing		
IQAFACA	Bed bug	1% spray (20% EC) (1.63 lb/gal SC/L)	Apply lightly but thoroughly to beds, mattresses, and other hiding places about the room. Direct the spray into all cracks and crevices and around baseboards, walls, and floors.
ITBSABA	Clothes moths	0.1% spray (1.63 lb/gal SC/L)	Moth proofing treatment. Apply lightly but thoroughly to infested areas on clothing and bedding. Pay special attention to folds and seams. Repeat at 30 day intervals as needed.
		0.5% spray (20% EC) (1.63 lb/gal SC/L)	Moth proofing treatment. Apply to materials immediately being prepared for storage. Dry clean before using articles.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/860020A	**Humans**		Do not apply more than 0.02 ounce per person. Allow 7 days between applications. If possible, individuals should bathe before treatment. Do not apply to individuals who have insect repellents, oil, or grease on the skin. Use a respirator or face mask if dispensed into air with a dust gun or blower. Allow 1 hour for the dust to settle before reentering. Do not bathe within 24 hours following treatment. Use limited to military personnel.
IMBEABA	Body louse	approximately 0.1 oz/person (1% D)	Human treatment. Remove clothing, turn inside out, and dust lightly over entire surface, rubbing the dust well into all seams. Repeat at 7 day intervals. To dust persons without removing clothing, fill the duster 75 percent full and adjust to deliver a heavy cloud of dust at each stroke. 1) Dust the inside of hat and replace on head. 2) Extend arms at side, shoulders height. Insert the delivery tube slowly up each sleeve between skin and inner garment. Blow powder into arm pit and about the shoulder. Also treat between individual layers of clothing. 3) Insert tube at back of neck dusting back and neckband. 4) Insert tube in front at neck and dust toward armpits, both sides of body, chest, and abdomen. 5) Loosen trousers, insert tube between skin and innermost garments, and powder generously crotch and pubic area, also underdrawers, especially waist and side seams. 6) Insert tube down rear of trousers next to skin and powder buttocks and rear of crotch. 7) Dust in socks.
IMBEACA IMBEADA	Crab louse Head louse	dust (1% D)	Human treatment. Dust into infested hairy portions of body and work down to the base of hair with finger tips. Make 2 additional applications at 7 day intervals.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Humans (continued)		
IMNAAAA	Fleas	dust (1% D)	Human treatment. Dust entire inner surfaces of undergarments, especially seams; also inner seams of trousers and shirt. Rub treated areas lightly by hand to spread dust evenly. Repeat at 7 day intervals and following each change of clothing.

AERIAL, MOTHPROOFING AND TANK MIX APPLICATIONS

9000900
AAAAAAA
Mothproofing

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Refer to
INDOOR
(Household)
Domestic Dwellings, Contents
(Domestic and Human Use)
Human Bedding, Blankets, Mattresses; Human Clothing

9900300
AAAAAAA
Tank Mix

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Refer to
TERRESTRIAL FOOD CROP
(Agricultural Crops)
Alfalfa, Barley, Beans, Beans (Succulent), Beets, Broccoli, Brussels Sprouts, Cabbage, Carrots, Cauliflower, Clover, Corn, Cotton, Cucumber, Flax, Lentils, Lettuce, Melons (including Cantaloupe and Watermelon), Oats, Okra, Onion, Peas, Pumpkin, Radish, Rye, Safflower, Sorghum, Soybeans, Spinach, Squash, Sudangrass, Sugar Beets, Sunflower, Tomato, Wheat
INDOOR
(Wood or Wood Structure Protection Treatments)
Unseasoned Forest Products

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Listing of Registered Pesticide Products by Formulation

&099.0001 99% technical chemical
lindane (gamma isomer of benzene hexachloride) (009001)
000655-00028 000655-00393 006305-00001 007501-00101

&099.5001 99.5% technical chemical
lindane (gamma isomer of benzene hexachloride) (009001)
000359-00686 000359-00687 000359-00710 000359-00712
000550-00110 005602-00096 019713-00061 021137-00003
040083-00001

&099.9901 100% technical chemical
lindane (gamma isomer of benzene hexachloride) (009001)
019713-00191 047916-00045 049911-00001 052693-00006

&210.0002 10% formulation intermediate
lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
000655-00044 000655-00045

&220.0002 20% formulation intermediate
lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
000655-00039

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
000655-00022

&025.0002 25% formulation intermediate
lindane (gamma isomer of benzene hexachloride) (009001)
000655-00021 000655-00023

&095.0002 95% formulation intermediate
lindane (gamma isomer of benzene hexachloride) (009001)
047916-00046 000655-00055

&000.5003 0.5% dust
lindane (gamma isomer of benzene hexachloride) (009001) plus captan (081301)
008590-00213

lindane (gamma isomer of benzene hexachloride) (009001), methoxychlor, technical (034001) plus sulfur or sulphur (077501)
000602-00007

&000.7503 0.75% dust
lindane (gamma isomer of benzene hexachloride) (009001)
003743-00287

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Listing of Registered Pesticide Products by Formulation (continued)

&001.0003 1% dust

lindane (gamma isomer of benzene hexachloride) (009001)
000226-00040 000400-00326 000769-00168 002169-00060
002217-00179 006830-00018 006830-00037 008590-00087

lindane (gamma isomer of benzene hexachloride) (009001) plus maneb (014505)
000226-00135

lindane (gamma isomer of benzene hexachloride) (009001) plus sulfur or sulphur (077501)
000602-00288

lindane (gamma isomer of benzene hexachloride) (009001), zineb (014506) plus thiram (079801)
000407-00295 000471-00009

lindane (gamma isomer of benzene hexachloride) (009001), zineb (014506), carbaryl (056801) plus sulfur or sulphur (077501)
001386-00323

lindane (gamma isomer of benzene hexachloride) (009001), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol (010501), zineb (014506), methoxychlor, technical (034001) plus 2,4-dinitro-6-octyl*phenyl crotonate 2,6-dinitro-4-octyl*phenyl crotonate nitrooctylphenols (principally dinitro) *a mixture of 1-methylheptyl, 1-ethylhexyl and 1 propylpentyl (036001)
000746-00110

lindane (gamma isomer of benzene hexachloride) (009001), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol (010501), zineb (014506), 2,4-dinitro-6-octyl*phenyl crotonate 2,6-dinitro-4-octyl*phenyl crotonate nitrooctylphenols (principally dinitro) *a mixture of 1-methylheptyl, 1-ethylhexyl and 1 propylpentyl (036001) plus carbaryl (056801)
000769-00299

&012.5003 12.5% dust

lindane (gamma isomer of benzene hexachloride) (009001) plus captan (081301)
000655-00623

&016.6003 16.6% dust

lindane (gamma isomer of benzene hexachloride) (009001) plus O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothiate (057801)
040831-00088

lindane (gamma isomer of benzene hexachloride) (009001), O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothiate (057801) plus captan (081301)
008203-00002 034704-00038 043789-00041

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Listing of Registered Pesticide Products by Formulation (continued)

&018.7503 18.75% dust

lindane (gamma isomer of benzene hexachloride) (009001) plus maneb (014505)

000554-00109 007501-00035 008203-00008 010912-00002
019382-00006 034704-00039 034704-00046 043789-00019

lindane (gamma isomer of benzene hexachloride) (009001), maneb (014505) plus carboxin (090201)

007501-00037

&025.0003 25% dust

lindane (gamma isomer of benzene hexachloride) (009001) plus captan (081301)

000228-00090 007501-00038 043789-00011 043789-00020

lindane (gamma isomer of benzene hexachloride) (009001), O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothiate (057801) plus captan (081301)

008203-00028

&075.0003 75% dust

lindane (gamma isomer of benzene hexachloride) (009001) plus captan (081301)

008203-00001

&003.0006 3% wettable powder

lindane (gamma isomer of benzene hexachloride) (009001), zineb (014506), carbaryl (056801) plus sulfur or sulphur (077501)

001386-00073

&006.0006 6% wettable powder

lindane (gamma isomer of benzene hexachloride) (009001)

000239-01769 000299-00149 000769-00050 001157-00009

&009.0006 9% wettable powder

lindane (gamma isomer of benzene hexachloride) (009001), zinc ion and manganese ethylene bisdithiocarbamate 80%, a coordination product of manganese 16%, zinc 2%, ethylene bisdithiocarbamate 62% (014504), 2,4-dinitro-6-octyl*phenyl crotonate 2,6-dinitro-4-octyl*phenyl crotonate nitrooctylphenols (principally dinitro) *a mixture of 1-methylheptyl, 1-ethylhexyl and 1 propylpentyl (036001) plus carbaryl (056801)

000602-00155

&010.0006 10% wettable powder

lindane (gamma isomer of benzene hexachloride) (009001)

003743-00339

&025.0006 25% wettable powder

lindane (gamma isomer of benzene hexachloride) (009001)

000226-00074 000239-02519 000655-00580 000746-00087
000769-00155 000904-00307 001386-00054 002393-00305

Listing of Registered Pesticide Products by Formulation (continued)

25% wettable powder (continued)

034704-00174   034704-00219   040831-00081   043789-00015
043789-00038

&075.0006 75% wettable powder
lindane (gamma isomer of benzene hexachloride) (009001)
000802-00081   034704-00220   043789-00040

&000.5007 0.5% wettable powder/dust
lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum derivative solvent (006501), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol (010501), carbaryl (056801) plus folpet (081601)
000004-00103

&001.0007 1% wettable powder/dust
lindane (gamma isomer of benzene hexachloride) (009001)
000407-00406   002393-00361

lindane (gamma isomer of benzene hexachloride) (009001), basic copper sulfate (008101), zineb (014506), carbaryl (056801) plus sulfur or sulphur (077501)
000728-00086

lindane (gamma isomer of benzene hexachloride) (009001), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol (010501), zineb (014506) plus 2,4-dinitro-6-octyl*phenyl crotonate 2,6-dinitro-4-octyl*phenyl crotonate nitrooctylphenols (principally dinitro) *a mixture of 1-methylheptyl, 1-ethylhexyl and 1 propylpentyl (036001)
002169-00114

lindane (gamma isomer of benzene hexachloride) (009001), zineb (014506), methoxychlor, technical (034001) plus 2,4-dinitro-6-octyl*phenyl crotonate 2,6-dinitro-4-octyl*phenyl crotonate nitrooctylphenols (principally dinitro) *a mixture of 1-methylheptyl, 1-ethylhexyl and 1 propylpentyl (036001)
000226-00196

&025.0007 25% wettable powder/dust
lindane (gamma isomer of benzene hexachloride) (009001)
000004-00076   000239-02519   000655-00580   000802-00076
002169-00113   040831-00097

&075.0007 75% wettable powder/dust
lindane (gamma isomer of benzene hexachloride) (009001)
000239-00353

&000.2710 0.27% impregnated materials
lindane (gamma isomer of benzene hexachloride) (009001)
003912-00001   003941-00028   007620-00001

&002.3010 2.3% impregnated materials

lindane (gamma isomer of benzene hexachloride) (009001)
001327-00016

&005.6010 5.6% impregnated materials

lindane (gamma isomer of benzene hexachloride) (009001)
001327-00015

&011.2010 11.2% impregnated materials

lindane (gamma isomer of benzene hexachloride) (009001)
001327-00027 001327-00028

&100.3512 0.35 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), aliphatic petroleum hydrocarbons (063503) plus xylene range aromatic solvent (086803)
001990-00355

&100.3612 0.36 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
002169-00127

&101.0012 1 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000550-00113

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
000769-00209 006830-00002

lindane (gamma isomer of benzene hexachloride) (009001) plus pentachloronitrobenzene (056502)
007501-00078

lindane (gamma isomer of benzene hexachloride) (009001) plus petroleum distillate (063503)
006651-00011

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
000148-00967 000400-00378 001386-00045

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
000550-00105 000655-00747 003743-00109 006720-00161

&101.6012 1.6 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus petroleum distillate (063503)
003743-00302

Listing of Registered Pesticide Products by Formulation (continued)

1.6 lb/gal emulsifiable concentrate (continued)

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
004887-00155 007273-00096

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
000279-00868

&101.6312 1.63 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
000655-00579 000655-00613 000655-00677

&101.6312 1.63 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
000239-02363 000769-00159 000769-00550

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
000728-00070

&101.6612 1.66 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), diisobutyl ketone [2,6-dimethyl-4-heptanone] (044107) plus xylene (086802)
005602-00120

&101.7012 1.7 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
000239-02518

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
002935-00377 008590-00384

&101.7512 1.75 lb/gal emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000802-00186

&200.4512 0.45% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), petroleum distillate (063503) plus xylene (086802)
047000-00016

&200.5012 0.5% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), orthodichlorobenzene (059401) plus petroleum distillate (063503)
005490-00001

Listing of Registered Pesticide Products by Formulation (continued)

&201.0012 1% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus kerosene (063501)
001452-00002

lindane (gamma isomer of benzene hexachloride) (009001), heavy aromatic naphtha (006602), petroleum distillate (063503), toxaphene (080501) plus xylene (086802)
000070-00086

&201.6812 1.68% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), 2,2-dichlorovinyl dimethyl phosphate plus related compounds (084001) plus xylene (086802)
001260-00076

&201.9612 1.96% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), petroleum distillate (063503), toxaphene (080501) plus xylene (086802)
047000-00025

&202.0012 2% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus toxaphene (080501)
002393-00400

lindane (gamma isomer of benzene hexachloride) (009001), malathion (057701), mineral seal oil (063502) plus xylene (086802)
000059-00123

&202.5012 2.5% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum derivative solvent (006501) plus toxaphene (080501)
002169-00158

lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum derivative solvent (006501) plus toxaphene (080501)
044215-00009

&203.9012 3.9% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
002382-00007

&204.2512 4.25% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), petroleum distillate (063503), pine oil (067002), piperonyl butoxide, technical (067501), pyrethrins (069001), poly(oxyethylene) sorbitol mixed ether ester (079007) plus xylene (086802)
003890-00002

Listing of Registered Pesticide Products by Formulation (continued)

&204.6012 4.6% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum derivative solvent (006501) plus naled (034401)
000239-01607

&205.0012 5% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000004-00220 005535-00092

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
000904-00215

lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum distillate (006601) plus pine oil (067002)
000070-00067

lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum derivative solvent (006501), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol (010501), carbaryl (056801) plus malathion (057701)
000004-00115

lindane (gamma isomer of benzene hexachloride) (009001), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol (010501), methoxychlor, technical (034001), malathion (057701) plus xylene (086802)
000572-00227 005887-00044

&206.5012 6.5% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum derivative solvent (006501) plus xylene (086802)
000602-00039 000602-00309

&206.6312 6.63% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), tetrachlorophenols (063004) plus xylene (086802)
001022-00477

&208.8212 8.82% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum distillate (006601)
002382-00004

&210.0012 10% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000070-00205 002393-00433

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
002217-00180 007401-00321

10% emulsifiable concentrate (continued)

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
034704-00158

&210.6812 10.68% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum distillate (006601)
000299-00184

&210.9412 10.94% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001), methylated naphthalenes (054002) plus xylene (086802)
005645-00003

&211.0012 11% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
002382-00011

lindane (gamma isomer of benzene hexachloride) (009001) plus methylated aromatic petroleum derivatives (054001)
004887-00018

&211.1412 11.14% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
002393-00371

&211.3412 11.34% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001) plus petroleum distillate (063503)
000453-00115

&211.3712 11.37% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
001022-00006 033560-00028

&212.2012 12.2% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001), petroleum distillate (006601) plus xylene (086802)
003890-00006

&212.2912 12.29% emulsifiable concentrate
lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
015146-00004

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Listing of Registered Pesticide Products by Formulation (continued)

&212.5012 12.5% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
002169-00296 028293-00044

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
047000-00014

&212.8012 12.8% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus petroleum distillate (063503)
000829-00221

&212.8912 12.89% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
002781-00003

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
028293-00043

&217.0012 17% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000299-00173

&220.0012 20% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000004-00084

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
000239-01173

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum distillate (006601)
040831-00080

lindane (gamma isomer of benzene hexachloride) (009001) plus heavy aromatic naphtha (006602)
000070-00163 000070-00273

lindane (gamma isomer of benzene hexachloride) (009001) plus cyclohexanone (025902)
000904-00185

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
000226-00068 000359-00711 002169-00110 007122-00041

Listing of Registered Pesticide Products by Formulation (continued)

20% emulsifiable concentrate (continued)

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
007401-00315

lindane (gamma isomer of benzene hexachloride) (009001), cyclohexanone (025902) plus xylene (086802)
005887-00054

&225.0012 25% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001) plus aromatic petroleum derivative solvent (006501)
006830-00022

lindane (gamma isomer of benzene hexachloride) (009001) plus petroleum distillate (063503)
043789-00073

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene (086802)
043789-00014 043789-00053

&240.0012 40% emulsifiable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000682-00026

&200.5014 0.5% flowable concentrate

lindane (gamma isomer of benzene hexachloride) (009001), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol (010501), 2,4-dinitro-6-octyl*phenyl crotonate 2,6-dinitro-4-octyl*phenyl crotonate nitrooctylphenols (principally dinitro) *a mixture of 1-methylheptyl, 1-ethylhexyl and 1 propylpentyl (036001), carbaryl (056801) plus captan (081301)
000004-00125

&201.0014 1% flowable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
000059-00191

&230.0014 30% flowable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
007501-00034 043789-00052

&240.0014 40% flowable concentrate

lindane (gamma isomer of benzene hexachloride) (009001)
007501-00016 043789-00051

&101.6515 1.65 lb/gal soluble concentrate/liquid

lindane (gamma isomer of benzene hexachloride) (009001) plus xylene range aromatic solvent (086803)
000550-00112

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Listing of Registered Pesticide Products by Formulation (continued)

&220.0015 20% soluble concentrate/liquid
lindane (gamma isomer of benzene hexachloride) (009001), 2-(2-butoxyethoxy)ethanol [diethylene glycol monobutyl ether] (042204) plus xylene (086802)
005602-00023

&102.6716 2.67 lb/gal liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
007501-00076

&104.0016 4 lb/gal liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
010912-00023

&200.0516 0.05% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001), piperonyl butoxide, technical (067501) plus pyrethrins (069001)
005645-00005

&200.0916 0.097% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
004691-00105

&200.1016 0.1% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
003487-00018

lindane (gamma isomer of benzene hexachloride) (009001) plus benzyl benzoate (009501)
028293-00040

lindane (gamma isomer of benzene hexachloride) (009001) plus rotenone (071003)
003487-00018 006175-00014

&200.2016 0.2% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001) plus petroleum distillate (063503)
001737-00007

&200.2516 0.25% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001) plus potassium tetrathionate (075903)
000059-00192

&200.3016 0.3% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
034731-00003

Listing of Registered Pesticide Products by Formulation (continued)

0.3% liquid-ready to use (continued)

lindane (gamma isomer of benzene hexachloride) (009001), polyoxyethylene lanolins (031607), sodium lauryl sulfate (079001), polyethylene glycol distearate (079073) plus lauramide DEA (000000)
002097-00007

&200.5016 0.5% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001) plus mineral spirits (063506)
001927-00008

lindane (gamma isomer of benzene hexachloride) (009001), methoxychlor, technical (034001) plus mineral spirits (063506)
000495-00004

lindane (gamma isomer of benzene hexachloride) (009001), benzyl benzoate (009501), rotenone (071003) plus xylene (086802)
006175-00015

lindane (gamma isomer of benzene hexachloride) (009001), aromatic petroleum derivative solvent (006501), methoxychlor, technical (034001), methylene chloride (042002) plus petroleum distillate (063503)
006152-00004

&201.0016 1% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
002169-00226 018901-00001 018901-00003

&202.0016 2% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
000395-00002 005602-00070

&203.0016 3% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
000299-00168

&205.0016 5% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001), malathion (057701) plus petroleum distillate (063503)
006218-00015

&208.6016 8.6% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001) plus maneb (014505)
000554-00133

&210.5016 10.5% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001) plus maneb (014505)
008203-00026 010912-00028

Listing of Registered Pesticide Products by Formulation (continued)

&214.6416 14.64% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
001927-00012

&225.0016 25% liquid-ready to use
lindane (gamma isomer of benzene hexachloride) (009001)
034704-00122

&200.2519 0.25% pressurized liquid
lindane (gamma isomer of benzene hexachloride) (009001), naled (034401)
petroleum distillate (063503)
005185-00196

&200.7519 0.75% pressurized liquid
lindane (gamma isomer of benzene hexachloride) (009001)
018910-00002

&203.0019 3% pressurized liquid
lindane (gamma isomer of benzene hexachloride) (009001)
000059-00164 000299-00165 002382-00080 007056-00103
011715-00094 028293-00053 043288-00013 044215-00057

LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)

Appendix A

Listing of Common Chemical Names Used on the Entry

Chemical Code	Common Name (source)	EPA Acceptable Common/Chemical Name
009001	lindane	lindane (gamma isomer of benzene hexachloride)
010501	dicofol	1,1-bis(chlorophenyl)-2,2,2-trichloroethanol
014504	mancozeb (ISO)	zinc ion and manganese ethylene bisthiocarbamate 80%, a coordination product of manganese 16%, zinc 2%, ethylene bisthiocarbamate 62%
034001	methoxychlor	methoxychlor, technical
036001	dinocap (ISO)	2,4-dinitro-6-octyl*phenyl crotonate 2,6-dinitro-4-octyl*phenyl crotonate nitrooctylphenols (principally dinitro) *a mixture of 1-methylheptyl, 1-ethylhexyl and 1-propylpentyl
057801	diazinon (ISO)	O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate
084001	vapona	2,2-dichlorovinyl dimethyl phosphate

III. REQUIREMENT FOR SUBMISSION OF GENERIC DATA

A. This portion of the Guidance Document is a Notice issued under the authority of FIFRA sec. 3(c)(2)(B). The tables following this section list the data required for maintaining the registrability of each product.

EPA has determined that additional generic data described in Table A must be submitted to EPA for evaluation in order to maintain in effect the registration(s) of your product(s) identified as an attachment to the cover letter accompanying this Guidance Document. As required by FIFRA sec. 3(c)(2)(B), you are required to take appropriate steps to comply with this Notice.

EPA may suspend the registration of each of those products unless, within the specified time, you have informed EPA how you will satisfy the requirements of this Notice. Any such suspension will remain in effect until you have complied with the terms of this Notice.

B. What Generic Data[1] Must be Submitted. You may determine which generic data you must submit by consulting Table A at the end of this chapter. That table lists the generic data needed to evaluate the continued registrability of all products, and the dates by which the data must be submitted. The required studies must be conducted in accordance with EPA approved protocols (such as those contained in the Pesticide Assessment Guidelines [2] or data collected under the approved protocols of the Organization for Economic Cooperation and Development (OECD). If you do not wish to develop data in support of certain uses appearing in your labeling, you may delete those uses at the time you submit your revised labeling.

For certain kinds of testing (generally ecological effects), EPA requires the test substance to be a "typical formulation," and in those cases EPA needs data of that type for each major formulation category (e.g., emulsifiable concentrates, wettable powders, granulars, etc.) These are classified as generic data and when needed are specified in Table A. EPA may possess data on certain "typical formulations" but not on others. Note: "Typical formulation" data should not be confused with product-specific data (Table B) which are required on each formulation. Product-specific data are further explained in Section IV of this document.

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[1] Generic data pertain to the properties or effects of a particular ingredient, and thus are relevant to an evaluation of the risks of all products containing that ingredient, regardless of the product's unique composition or specific use. Product-specific data relate only to the properties or effects of a product with a particular composition (or a group of products with closely similar composition).

[2] The Pesticide Assessment Guidelines are available in hard copy or microfiche from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

C. Options Available for Complying With Requirements to Submit Data

Within 90 days of your receipt of this Notice you must submit to EPA a completed copy of the form entitled "FIFRA Section 3(c)(2)(B) Summary Sheet" [EPA Form 8580-1, Appendix II-3] for each of your products. On that form you must state which of the following methods you will use to comply with the requirements of this Notice:

1. (a) Notify EPA that you will submit the data, and

(b) either submit the existing data you believe will satisfy the requirement, or state that you will generate the data by conducting testing. If the test procedures you will use deviate from (or are not specified in) the Pesticide Assessment Guidelines or protocols contained in the Reports of Expert Groups to the Chemicals Group, Organization for Economic Cooperation and Development (OECD) Chemicals Testing Programme, you must enclose the protocols you will use.

OR

2. Notify EPA that you have entered into an agreement with one or more other registrants to jointly develop (or share in the cost of developing) the data. If you elect this option, you must notify EPA which registrant(s) are parties to the agreement.

OR

3. File with EPA a completed "Certification of Attempt to Enter Into an Agreement With Other Registrants for Development of Data" (EPA Form 8580-6, Appendix II-4)*/

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*/ FIFRA sec. 3(c)(2)(B) authorizes joint development of data by two or more registrants, and provides a mechanism by which parties can obtain an arbitrator's decision if they agree to jointly develop data but fail to agree on all the terms of the agreement. The statute does not compel any registrant to agree to develop data jointly.

(Footnote continued on next page)

OR

4. Request that EPA amend your registration by deleting the uses for which the data are needed. (This option is not available to applicants for new products.)

OR

5. Request voluntary cancellation of the registration(s) of your products for which the data are needed. (This option is not available to applicants for new products.)

D. Procedures for Requesting Changes in Testing Methodology and Extensions of Time

EPA recognizes that you may disagree with our conclusions regarding the appropriate ways to develop the required data or how quickly the data must be submitted. If the test procedures you plan to use deviate from (or are not specified in) the registration guidelines or protocols contained in the reports of the Expert Groups to the Chemical Groups, Organization for Economic Cooperation and Development (OECD) Chemicals Testing Programme, you must submit the protocol to the Product Manager, Registration Division, and to the Office of Compliance Monitoring (addresses on page 252 of this Standard) for Agency review prior to the initiation of the test.

If you think that you will need more time to generate the required data than is allowed by EPA's schedule, you may submit a request for an extension of time. The extension request must be submitted in writing to the Product Manager, Registration Division, and to the Office of Compliance Monitoring. The extension request should state the reasons why you believe that an extension is appropriate. While EPA considers your request, you must strive to meet the deadline for submitting the required data.

(Footnote continued from previous page)

In EPA's opinion, joint data development by all registrants subject to a data requirement or a cost-sharing agreement among all such registrants is clearly in the public interest. Duplication of testing could increase costs, tie up testing facilities, and subject an unnecessarily large number of animals to testing.

As noted earlier, EPA has discretion to suspend the registration of a product when a registrant fails to submit data required under FIFRA Section 3(c)(2)(B). EPA has concluded that it should encourage joint testing rather than duplicative testing, and that suspension should be withheld in certain cases. Accordingly, if (1) a registrant has informed us of his intent to develop and submit data required by this Notice; and (2) a second registrant informs EPA that it has made a bona fide offer to the first registrant to share in the expenses of the testing [on terms to be agreed upon or determined by arbitration under FIFRA Section 3(c)(2)(B)(iii)]; and (3) the first registrant has declined to agree to enter into a cost-sharing agreement, EPA will not suspend the second firm's registration.

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Guideline Citation and Name of Test	Test Substance	Guidelines Status	Are Data Required? Yes	No	Footnote Number	Data Must Be Submitted Within Time Frames Listed Below 1/
§158.120 Product Chemistry						
Product Identity:						
61-1 - Product Identity and Disclosure of Ingredients	TGAI	R	☐	☒		
61-2 - Description of Beginning Materials and Manufacturing Process	TGAI	R	☒	☐		6 Months
61-3 - Discussion of Formation of Unintentional Ingredients	TGAI	R	☒	☐	2	6 Months
Analysis and Certification of Product Ingredients						
62-1 - Preliminary Analysis	TGAI	R	☒	☐	3	12 Months
62-2 - Certification of Limits	TGAI	R	☒	☐		12 Months
62-3 - Analytical Methods to Verify Certified Limit	TGAI	R	☒	☐		12 Months
Physical and Chemical Characteristics						
63-2 - Color	TGAI	R	☐	☒		
63-3 - Physical State	TGAI	R	☐	☒		
63-4 - Odor	TGAI	R	☐	☒		
63-5 - Melting Point	TGAI	R	☐	☒		
63-6 - Boiling Point	TGAI	NA	☐	☒		

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Guideline Citation and Name of Test	Test Substance	Guidelines Status	Are Data Required?		Footnote Number	Data Must Be Submitted Within Time Frames Listed Below 1/
			Yes	No		
§158.120 Product Chemistry (Continued)						
Physical and Chemical Characteristics (Continued)						
63-7 - Density, Bulk Density, or Specific Gravity	TGAI	R	☐	☒	____	
63-8 - Solubility	TGAI	R	☐	☒	____	
63-9 - Vapor Pressure	TGAI	R	☐	☒	____	
63-10 - Dissociation constant	TGAI	NA	☐	☒	____	
63-11 - Octanol/water partition coefficient	TGAI	R	☒	☐	____	6 Months
63-12 - pH	TGAI	NA	☐	☒	____	
63-13 - Stability	TGAI	R	☐	☒	____	
Other Requirements:						
64- 1 - Submittal of samples	TGAI	CR	☐	☐	____	

TGAI = Technical Grade of the Active Ingredient; R = Required; CR = Conditionally Required; NA = Not Applicable
1/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
2/ The discussion must specifically address the potential for formation of dioxins and dibenzofurans.
3/ Analysis must identify and quantify all components present at greater than 0.1%.

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 2/
§158.125 Residue Chemistry					
171-4 - Nature of Residue					
- Plants	PAIRA	Partially	00025707 00060143 00060150 00105413 GS0315001 GS0315002 GS0315003	Yes3/	24 Months
- Livestock	PAIRA and Plant Metabolites	Partially	GS0315004 GS0315005 GS0315006	Yes4/	18 Months
171-4 - Residue Analytical Method					
- Plant and Animal Residues	TGAI and	Partially	00025690 00032233 00099909 05002348 05003005 05006312 GS0315007	Reserved5/	

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Storage Stability Data	PAI	No	-	Yes6/	12 Months
	Metabolites	No	-	Reserved7/	
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/					
- Crop Group #1 - Root and Tuber Vegetables 11/					
o Crop 1 - Beets					
-- Crop field trials	TEP	No	-	Yes12/	48 Months
o Crop 2 - Carrots					
-- Crop field trials	TEP	No	-	Yes13/	48 Months
o Crop 3 - Sugar Beets					
-- Crop field trials	TEP	No	-	Yes14/	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved15/	
o Crop 4 - Radishes					
-- Crop field trials	TEP	No	-	Yes16/	48 Months

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #2 - Leaves of Root and Tuber Vegetable Group11/					
o Crop 1 - Beet Greens					
-- Crop field trials	TEP	No	-	Yes17/	48 Months
o Crop 2 - Sugar Beet Tops					
-- Crop field trials	TEP	No	-	Yes18/	48 Months
o Crop 3 - Radish Tops					
— Crop field trials	TEP	No	-	Yes19/	48 Months
- Crop Group #3 - Bulb Vegetables Group20/					
o Crop 1 - Onions (dry bulb)					
— Crop field trials	TEP	No	-	Yes21/	48 Months

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 2/
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #4 - Leafy Vegetables (except Brassica) Group22/					
o Crop 1 - Celery					
-- Crop field trials	TEP	No	-	Yes23/	48 Months
o Crop 2 - Lettuce					
-- Crop field trials	TEP	No	-	Yes24/	48 Months
o Crop 3 - Spinach					
-- Crop field trials	TEP	No	-	Yes25/	48 Months
o Crop 4 - Swiss Chard					
-- Crop field trials	TEP	No	-	Yes26/	48 Months

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 2/
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ Continued)					
- Crop Group #5 - Brassica (Cole) Leafy Vegetable Group27/					
o Crop 1 - Broccoli					
-- Crop field trials	TEP	No	-	Yes28/	48 Months
o Crop 2 - Brussel Sprouts					
-- Crop field trials	TEP	No	-	Yes29/	48 Months
o Crop 3 - Cabbage					
-- Crop field trials	TEP	No	-	Yes30/	48 Months
o Crop 4 - Cauliflower					
-- Crop field trials	TEP	No	-	Yes31/	48 Months

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies [8/,9/,10/] (Continued)					
- Crop Group #5 - Brassica (Cole) Leafy Vegetable Group[27/] (Continued)					
o Crop 5 - Collards					
-- Crop field trials	TEP	No	-	Yes[32/]	48 Months
o Crop 6 - Kale					
— Crop field trials	TEP	No	-	Yes[33/]	48 Months
o Crop 7 - Mustard Greens					
-- Crop field trials	TEP	No	-	Yes[34/]	48 Months
o Crop 8 - Kohlrabi					
-- Crop field trials	TEP	No	-	Yes[35/]	48 Months

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Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies [8/,9/,10/] (Continued)					
- Crop Group #6 - Legume Vegetables (Succulent or Dried) Group & their Foliage[36/]					
o Crop 1 - Beans					
-- Crop field trials	TEP	No	-	Yes[37]	48 Months
o Crop 2 - Beans, Succulent					
-- Crop field trials	TEP	No	-	Yes[38/]	48 Months
o Crop 3 - Lentils					
-- Crop field trials	TEP	No	-	Yes[39/]	48 Months
o Crop 4 - Peas (incl. Cowpeas)					
-- Crop field trials	TEP	No	-	Yes[40/]	48 Months
o Crop 5 - Soybeans					
-- Crop field trials	TEP	No	-	Yes[41/]	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved[42/]	

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Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue -					
Residue Studies [8/],[9/],[10/] (Continued)					
- Crop Group #7 - Fruiting Vegetables (except cucurbits) Group[43/]					
o Crop 1 - Eggplant					
-- Crop field trials	TEP	No	-	Yes[44/]	48 Months
o Crop 2 - Peppers					
-- Crop field trials	TEP	No	-	Yes[45/]	48 Months
o Crop 3 - Tomatoes					
-- Crop field trials	TEP	No	-	Yes[46/]	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved[47/]	
- Crop Group #8 - Cucurbit Vegetable Group[48/]					
o Crop 1 - Cucumbers					
-- Crop field trials	TEP	No	-	Yes[49/]	48 Months

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Data Requirement	Composition [1]	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission [2]
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies [8],[9],[10] (Continued)					
- Crop Group #8 - Cucurbit Vegetable Group[48] (Continued)					
o Crop 2 - Melons					
-- Crop field trials	TEP	No	-	Yes[50]	48 Months
o Crop 3 - Pumpkins					
-- Crop field trials	TEP	No	-	Yes[51]	48 Months
o Crop 4 - Squash					
-- Crop field trials	TEP	No	-	Yes[52]	48 Months
- Crop Group #9 - Pome Fruits Group[53]					
o Crop 1 - Apples					
-- Crop field trials	TEP	No	-	Yes[54]	48 Months
-- Processed Food/Feed	TEP	No	-	Yes[55]	48 Months

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Data Requirement	Composition [1]	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission [2]
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies [8],[9],[10] (Continued)					
- Crop Group #9 - Pome Fruits Group[53] (Continued)					
o Crop 2 - Pears					
— Crop field trials	TEP	No	-	Yes[56]	48 Months
- Crop Group #10 - Stone Fruits Group[57]					
o Crop 1 - Apricots					
— Crop field trials	TEP	No	-	Yes[58]	48 Months
o Crop 2 - Cherries					
— Crop field trials	TEP	No	-	Yes[59]	48 Months
o Crop 3 - Nectarines					
— Crop field trials	TEP	No	-	Yes[60]	48 Months
o Crop 4 - Peaches					
— Crop field trials	TEP	No	-	Yes[61]	48 Months

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Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 2/
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #10 - Stone Fruits Group57/ (Continued)					
o Crop 5 - Plums					
-- Crop field trials	TEP	No	-	Yes62/	48 Months
-- Processed Food/Feed	TEP	No	-	Yes63/	48 Months
o Crop 6 - Prunes					
-- Crop field trials	TEP	No	-	Yes64/	48 Months
-- Processed Food/Feed	TEP	No	-	Yes65/	48 Months
o Crop 7 - Quince					
-- Crop field trials	TEP	No	-	Yes66/	48 Months
- Crop Group #11 - Small Fruits and Berries Group67/					
o Crop 1 - Grapes					
-- Crop field trials	TEP	No	-	Yes68/	48 Months
-- Processed Food/Feed	TEP	No	-	Yes69/	48 Months

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Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #11 - Small Fruits and Berries Group67/					
o Crop 2 - Strawberries					
-- Crop field trials	TEP	No	-	Yes70/	48 Months
- Crop Group #12 - Tree Nuts Group71/					
o Crop 1 - Pecans					
-- Crop field trials	TEP	No	-	Yes72/	48 Months
- Crop Group #13 - Cereal Grains Group73/ [including Forage, Fodder & Straw]					
o Crop 1 - Barley					
-- Crop field trials	TEP	No	-	Yes74/	48 Months
-- Processed Food/Feed	TEP	No	-	Yes75/	48 Months

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Data Requirement	Composition[1]	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission[2]
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies [8],[9],[10] (Continued)					
- Crop Group #13 - Cereal Grains Group[73] [including Forage, Fodder & Straw] (Continued)					
o Crop 2 - Corn					
-- Crop field trials	TEP	No	-	Yes[76]	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved[77]	48 Months
o Crop 3 - Oats					
-- Crop field trials	TEP	No	-	Yes[78]	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved[79]	48 Months
o Crop 4 - Rye					
-- Crop field trials	TEP	No	-	Yes[80]	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved[81]	48 Months
o Crop 5 - Sorghum (incl. Milo Sorghum)					
-- Crop field trials	TEP	No	-	Yes[82]	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved[83]	48 Months

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Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 2/
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #13 - Cereal Grains Group73/ [including Forage, Fodder & Straw] (Continued)					
o Crop 6 - Wheat					
-- Crop field trials	TEP	No	-	Yes84/	48 Months
-- Processed Food/Feed	TEP	No	-	Reserved85/	48 Months
- Crop Group #14 - Grass Forage, Fodder and Hay Group86/					
o Crop 1 - Sudangrass					
-- Crop field trials	TEP	No	-	Yes87/	48 Months
- Crop Group #15 - Non-Grass Animal Feeds [Forage, Fodder, Straw, and Hay] Group88/					
o Crop 1 - Alfalfa					
-- Crop field trials	TEP	No	-	Yes89/	48 Months

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GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #15 - Non-Grass Animal Feeds [Forage, Fodder, Straw, and Hay] Group88/ (Continued)					
o Crop 2 - Clover					
-- Crop field trials	TEP	No	-	Yes90/	48 Months
- Crop Group #16 - Miscellaneous Crops					
o Crop 1 - Asparagus					
-- Crop field trials	TEP	No	-	Yes91/	48 Months
o Crop 2 - Avocados					
-- Crop field trials	TEP	No	-	Yes92/	48 Months
o Crop 3 - Cotton					
-- Crop field trials	TEP	No	-	Yes93/	48 Months
-- Processed Food/Feed	TEP	No	-	Yes94/	48 Months

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Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #16 - Miscellaneous Crops (Continued)					
o Crop 4 - Flax					
-- Crop field trials	TEP	No	-	Yes[95]/	48 Months
-- Processed Food/Feed	TEP	No	-	Yes[96]/	48 Months
o Crop 5 - Guavas					
-- Crop field trials	TEP	No	-	Yes[97]/	48 Months
o Crop 6 - Mangoes					
-- Crop field trials	TEP	No	-	Yes[98]/	48 Months
o Crop 7 - Mushrooms					
-- Crop field trials	TEP	No	-	Yes[99]/	48 Months
o Crop 8 - Okra					
-- Crop field trials	TEP	No	-	Yes[100]/	48 Months

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GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies 8/,9/,10/ (Continued)					
- Crop Group #16 - Miscellaneous Crops (Continued)					
o Crop 9 - Pineapples					
-- Crop field trials	TEP	No	-	Yes[101]	48 Months
-- Processed Food/Feed	TEP	No	-	Yes[102]	48 Months
o Crop 10 - Safflower					
-- Crop field trials	TEP	No	-	Yes[103]	48 Months
-- Processed Food/Feed	TEP	No	-	Yes[104]	48 Months
o Crop 11 - Sunflower					
-- Crop field trials	TEP	No	-	Yes[105]	48 Months
-- Processed Food/Feed	TEP	No	-	Yes[106]	48 Months
o Crop 12 - Tobacco					
-- Crop field trials	TEP	No	-	Yes[107]	48 Months

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GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition [1/]	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission [2/]
§158.125 Residue Chemistry (Continued)					
171-4 - Magnitude of the Residue - Residue Studies [8/],[9/],[10/] (Continued)					
- Meat (includes meat, fat, and meat by-products)	TGAI and Plant Metabolites	Partially	00045126 00088165 00089592 00101478 00118724 00118725	Yes[108/]	18 Months
- Milk	TGAI and Plant Metabolites	Partially	00104441 00025685 00075989 00088048 00118722 00118723 00118725 00118739 00098785 GS0315009 GS0315010	Yes[109/]	18 Months
- Poultry and Eggs	TGAI and Plant Metabolites	No	-	Yes[110/]	18 Months

§ 158.125 Residue Chemistry (continued)

1/ Composition: TGAI = Technical Grade of the Active Ingredient; PAIRA = Pure Active Ingredient, Radio-labeled; PAI = Pure Active Ingredient; TEP = Typical End-Use Product

2/ Due dates refers to number of months following receipt of this Registration Standard.

3/ None of the available metabolism studies has provided an adequate accounting of the terminal plant residues, which may include polar and non-polar metabolites. Metabolism studies of radiolabeled lindane are required for representative crops from three crop groupings (cucurbits, leafy vegetables, and a pome or stone tree fruit). If metabolism data differ significantly among these crops, then metabolism data will be required for a representative crop from each crop grouping for which there is a registered tolerance.

4/ Animal metabolism studys are required to identify the residues of parent lindane and all metabolites in both a lactacting ruminant (meat and milk) and poultry (meat and eggs). The lactating ruminant study must employ ^{14}C-labeled lindane with a feeding level high enough for identification of the radioactive residues in tissues and milk. The test animals must be dosed for at least 3 consecutive days at this level. Since lindane may also be applied as a livestock dip, the test animals must also be dipped in ^{14}C-labeled lindane, in order to reflect both modes of exposure. If the required plant metabolism studies result in the identification of a metabolite that is not found in animals, then an additional ruminant metabolism study that involves dosing with this metabolite will be required. The poultry study must employ ^{14}C-labeled lindane with feeding level high enough for identification of the radioactive residues in tissues and eggs. The test animals must be dosed for at least 3 consecutive days at this level. If the required plant metabolism studies result in the identification of a metabolite that is not found in poultry, then an additional poultry metabolism study involving dosing with this metabolite will be required.

5/ Adequate methodology is available only for the analysis of parent lindane itself. If the required plant and animal metabolism studies establish that other residues of toxicological concern are present in plant and/or animal commodities, appropriate analytical methodology will have to be developed and validated.

6/ Data delineating the stability of lindane residues in/on representative crops from 3 crop groupings (cucurbits, leafy vegetables, and a tree fruit - stone or pome) are required. Also, data describing the stability of lindane in at least one animal commodity (tissue or milk) is required. If the required plant and animal metabolism studies indicate the occurrence of residues of toxicological concern (in addition to the parent lindane itself), storage stability on these residues will also be required.

7/ If the required plant and animal metabolism studies indicate the occurrence of residues of toxicological concern (in addition to the parent lindane itself), storage stability on these residues will also be required.

8/ If the required ^{14}C-labeled studies indicate that method sensitivity tolerances would be adequate to cover residues in crops for which lindane is registered only for seed treatment, i.e. only very low levels of radioactivity are observed in the raw agricultural commodity, then the geographical representation requirement for residue data reflecting seed treatment may be waived.

9/ If residue data for crops having registered soil, seed, and foliar uses indicate that significant residues result from foliar treatment, then the residue data requirements for soil and seed treatment may be waived.

§ 158.125 Residue Chemistry (continued)

10/ If the required plant metabolism studies indicate the presence of other residues besides parent lindane, residue analyses must be performed for these other components (in addition to parent lindane) for each crop identified in this Registration Standard as having outstanding residue data requirements.

11/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (carrot, potato, radish, and sugar beet) and the metabolism of lindane in plants is not adequately understood.

12/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data from New York, Texas/Oklahoma, and Wisconsin) should be proposed for residues of lindane on beets arising from the treatment of beet seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to edible portions of the plant could be used to support the position that beet seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on beets (roots and greens) must be removed from labeling.

13/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data from California, Michigan/Wisconsin, Texas/Arizona, Washington/Oregon, and New York/New Jersey) should be proposed for residues of lindane on carrots arising from the treatment of carrot seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to edible portions of the plant could be used to support the position that carrot seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on carrots must be removed from labeling.

14/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data from California, Minnesota/North Dakota, Idaho, Washington, Nebraska, Wyoming, and Michigan) should be proposed for residues of lindane on sugar beets (roots and tops) arising from the treatment of sugar beet seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to edible portion of the plant could be used to support the position that sugar beet seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on sugar beets (roots and tops) must be removed from labeling.

15/ A processing study showing whether concentration of lindane residues occurs in sugar, molasses, and pulp will be required if significant levels of lindane residues are detected in sugar beets grown from beet seed treated at exaggerated application rates.

16/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data from California, and Florida) should be proposed for residues of lindane on radishes arising from the treatment of radish seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to edible portion of the plant could be used to support the position that radish seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on radishes must be removed from labeling.

17/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. Since beet tops are a food item, an appropriate tolerance (supported by adequate residue data from New York, Texas/Oklahoma, and Wisconsin) should be proposed for residues of lindane on beets arising from the treatment of beet seed. This data must reflect the maximum intended use and analysis for the terminal residues of concern. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to edible portion of the plant could be used to support the position that beet seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on beets (roots and greens) must be removed from labeling.

18/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. Since sugar beet tops are a feed item, an appropriate tolerance (supported by adequate residue data from California, Minnesota/North Dakota, Idaho, Washington, Nebraska, Wyoming, and Michigan) should be proposed for residues of lindane on sugar beets (roots and tops) arising from the treatment of sugar beet seed. This data must reflect the maximum intended use and analysis for the terminal residues of concern. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to edible portion of the plant could be used to support the position that beet seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on sugar beets (roots and tops) must be removed from labeling.

19/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. Since radish tops are a food item, an appropriate tolerance (supported by adequate residue data from California and Florida) should be proposed for residues of lindane on radishes arising from the treatment of radish seed. This data must reflect the maximum intended use and analysis for the terminal residues of concern. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to edible portion of the plant could be used to support the position that radish seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on radishes must be removed from labeling.

20/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (onion and one other commodity besides onion) and the metabolism of lindane in plants is not adequately understood.

21/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on onions must be submitted. The data must be developed from field trials in New York, Michigan, Oregon/ Washington, Idaho, and Colorado. If onions are to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of application at the maximum application rates are required. Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. [Continued on next page]

21/ [Continued from previous page] The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. A pre-harvest interval (PHI) supported by adequate residue data must appear on all labels with this crop site. If treatment is restricted to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on onions must be removed from labeling.

22/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (celery, lettuce, and spinach) and the metabolism of lindane in plants is not adequately understood.

23/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on celery must be submitted. The data must be developed from field trials in California, Florida, Michigan, and Washington. The residue data should reflect analyses on both trimmed and untrimmed samples, as untrimmed celery may enter interstate commerce. Only obviously decomposed outer leaves or petioles should be removed. Since both foliar and soil applications are permitted, residue data reflecting collectively both modes of application at the maximum application rates are required. Alternatively, it use is limited to either soil or foliar application, then revised labeling showing only one method of application will be required. The residue data must include results from treatment with EC formulations, since residues are expected to be higher from that type of formulation. A definite pre-harvest interval (PHI) in terms of days, supported by adequate residue data, must appear on all lindane labels with the celery use, rather than the current vague restriction against applying after it is half grown or has begun to bunch. Revised labeling must be submitted that specify the number of applications permitted per season and the time period between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on celery must be removed from labeling.

24/ Residue data in the form of a pesticide petition to support the current tolerance of 3.0 ppm on lettuce must be submitted. The data must be developed from field trials in California, Florida, Texas/Arkansas, New York/New Jersey, Colorado, and Washington. Adequate greenhouse trials (including storage stability data for lindane residues on lettuce and details of the analytical methodology) are also required to support the fumigation use on this crop. The residue data should reflect analyses carried out on samples which have received the minimum amount of trimming expected of lettuce which enters interstate commerce. Only obviously decomposed outer leaves should be removed. Since untrimmed lettuce may also enter interstate commerce, untrimmed samples should also be analyzed. If lettuce is to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. A definite pre-harvest interval (PHI), supported by adequate residue data, must appear on all labels with the lettuce use pattern rather than the current vague instruction not to apply after the seedling stage. [Continued on next page]

24/ [Continued from previous page] If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Revised labeling must be submitted that specify the total number of applications permitted per season and the time period between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on lettuce must be removed from labeling.

25/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on spinach must be submitted. The data must be developed from field trials in California, Texas/Oklahoma, New Jersey, Maryland/Virginia, and Colorado/Arkansas. If spinach is to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. The curent instruction limiting lindane application to spinach in the seedling stage is too vague. A more definite pre-harvest interval (PHI), expressed in terms of days or the height of the seedling, must appear on all labels with the spinach use pattern. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Revised labeling must be submitted that specify the total number of applications permitted per growing season and the time period between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on spinach must be removed from labeling.

26/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on swiss chard must be submitted. The data must be developed from field trials in California, New Jersey, and Texas. Appropriate labeling describing the application methods and rates, and any limitations, pertaining to the use of lindane on swiss chard must also be submitted.

27/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (broccoli, cabbage, and mustard greens) and the metabolism of lindane in plants is not adequately understood.

28/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on broccoli must be submitted. The data must be developed from field trials in California, Texas/Arizona, and Oregon. If broccoli is to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted showing a pre-harvest interval (PHI), in terms of days, associated with the use of lindane applied to the soil around the base of the plant. Also, revised labeling must be submitted that specifies the total number of applications permitted per growing season for either the foliar or the soil (plant base) application method and the time period between these applications. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on broccoli must be removed from labeling.

29/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on brussels sprouts must be submitted. The data must be developed from field trials in California, New York, and Oregon. If brussels sprouts are to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted showing a pre-harvest interval (PHI), in terms of days, associated with the use of lindane applied to the soil around the base of the plant, and specifying the total number of applications permitted per growing season for either the foliar or the soil (plant base) application method and interval between these applications. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on brussels sprouts must be removed from labeling.

30/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on cabbage must be submitted. The data must be developed from field trials in California, New York/New Jersey, Florida, Texas, Wisconsin, and South Carolina/North Carolina/Georgia/Tennessee. If cabbage is to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar application collectively at the maximum application rates will be adequate. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted showing a pre-harvest interval (PHI), in terms of days, associated with the use of lindane applied to the soil around the base of the plant, and specifying the total number of applications permitted per growing season for either the foliar or the soil (plant base) application method and the time period between these applications. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on cabbage must be removed from labeling.

31/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on cauliflower must be submitted. The data must be developed from field trials in Washington/Oregon, California, Florida, Texas/Arizona, New York, and Michigan. If cauliflower is to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar application collectively at the maximum application rates will be adequate. The residue data must include results from treatment EC formulations, since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted showing a pre-harvest interval (PHI), in terms of days, associated with the use of lindane applied to the soil around the base of the plant, and specifying the total number of applications permitted per growing season for either the foliar or the soil application method and the time

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31/ [Continued from previous page] period between these applications. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on cauliflower must be removed from labeling.

32/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on collards must be submitted. The data must be developed from field trials in Florida/Georgia/South Carolina, Texas/Arizona, and New Jersey. If collards are to be subjected to both soil and foliar treatment, then residue data reflecting soil and foliar treatments at the maximum application rates are required. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted showing a more definite pre-harvest interval (PHI), rather than the current restriction against applying lindane after the edible parts of the plant have appeared (since the edible part of the plant is the leaf, which appears as soon as the plant sprouts). In addition, revised labeling must specify the number of applications permitted per growing season for the foliar application method and the interval between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on cabbage must be removed from labeling.

33/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on kale must be submitted. The data must be developed from field trials in Georgia, California, Texas, and Virginia. If kale is to be subjected to both soil and foliar treatment, then residue data reflecting soil and foliar treatments at the maximum application rates are required. The residue data must include results from treatment with EC formulations since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted showing a more definite pre-harvest interval (PHI), rather than the current limitation against applying lindane after the edible parts of the plant have appeared (since the edible part of the plant is the leaf, which appears as soon as the plant sprouts). In addition, revised labeling must specify the number of applications permitted per growing season for the foliar application method and the interval between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on kale must be removed from labeling.

34/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on mustard greens must be submitted. The data must be developed from field trials in Texas/Arizona, California, and Florida. Appropriate labeling describing acceptable application methods and rates, and any limitations, pertaining to the use of lindane on mustard greens must also be submitted.

35/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on kohlrabi must be submitted. The data must be developed from field trials in Texas, and California. Appropriate labeling describing acceptable application methods and rates, and any limitations, pertaining to the use of lindane kohlrabi must also be submitted.

36/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (beans - one succulent and one dried variety; peas - one succculent and one dried variety; and soybeans) and the metabolism of lindane in plants is not adequately understood.

37/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data from areas where the type(s) of bean included in this use are grown) should be proposed for residues of lindane on beans (i.e., the second generation of beans) arising from the treatment of bean seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that bean seed treatment is a non-food use that does not require a tolerance. Since bean forage and hay are feed items, it will also be necessary to either submit residue data on forage and hay grown from treated seed or to submit revised labeling that prohibits the feeding of bean hay and forage to livestock. Revised labeling must be submitted that states either the type of bean (such as garbanzo, mung, etc.), or for a more general use, whether the beans are to be succulent or dried. Currently, the dosage for "Beans" is 1 ounce per 100 pounds of seed, while the dosage for succulent beans is 0.5 ounces per 100 pounds of seed. If the commodity "Beans" is to include succulent beans, these disparate dosages will have to be brought into agreement in revised labeling. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on beans must be removed from labeling.

38/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data on several types of succulent bean from New York/New Jersey/Delaware, Tennessee/North Carolina/Virginia, California, Michigan, and Florida should be proposed for residues of lindane on beans (i.e., the second generation of beans) arising from the treatment of bean seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that bean seed treatment is a non-food use that does not require a tolerance. Since bean forage and hay are feed items, it will also be necessary to either submit residue data on forage and hay grown from treated seed or to submit revised labeling that prohibits the feeding of bean hay and forage to livestock. Currently, the dosage for succulent beans is 0.5 ounces per 100 pounds of seed, while the dosage for "Beans" is 1 ounce per 100 pounds of seed, It the commodity "Beans" is to include succulent beans, these disparate dosages will have to be brought into agreement in revised labeling. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on beans must be removed from labeling.

39/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data from Washington and Idaho should be proposed for residues of lindane on lentils (i.e, the second generation of lentils) arising from the treatment of lentil seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that lentil seed treatment is a non-food use that does not require a tolerance. Since lentil forage and hay are livestock feed items, it will also be necessary to either submit residue data on and hay grown from treated seed or to submit revised labeling that prohibits the feeding of lentil hay and forage to livestock. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on lentils must be removed from labeling.

40/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data on several types of dried and succulent peas from Illinois, Delaware, California, Idaho, Texas and Florida should be proposed for residues of lindane on peas (i.e., the second generation of peas) arising from the treatment of pea seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that pea seed treatment is a non-food use that does not require a tolerance. Since pea vines and hay are livestock feed items, it will also be necessary to either submit residue data on vines and hay grown from treated seed or to submit revised labeling that prohibits the feeding of pea vines and hay to livestock. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on peas must be removed from labeling.

41/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the edible portions of the plant. An appropriate tolerance (supported by adequate residue data from Mississippi/Louisiana, Tennessee, Arkansas, Indiana/Illinois, Idaho/Nebraska, Minnestoa, and Missouri should be proposed for residues of lindane on soybeans (i.e., the second generation of beans) arising from the treatment of soybeans seeds. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that soybean seed treatment is a non-food use that does not require a tolerance. Since soybean hay, straw, and forage are livestock feed items, it will also be necessary to either submit residue data on these items or to submit revised labeling that prohibits the feeding of soybean hay, straw, and forage to livestock. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on soybeans must be removed from labeling.

42/ If residues occur on soybeans as a result of seed treatment, a processing study involving analyses of hulls meal, oil, and soapstock will be required. If concentration occurs in any by-product, food/feed additive tolerances will be needed. A food additive tolerance will not be needed for residues of lindane in refined oil, however, because it has been shown that lindane residues do not survive the deodorization and hydrogenation processes.

43/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (tomatoes and peppers) and the metabolism of lindane in plants is not adequately understood.

44/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on eggplants must be submitted. The data must be developed from field trials in California, Florida, Texas, and New Jersey. The residue data must include results from treatment with EC formulations since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted that specifies the total number of applications permitted per growing season and the interval between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on eggplant must be removed from labeling.

45/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on peppers must be submitted. Data on bell peppers must be developed from field trials in in California, Florida, Texas, North Carolina, and New Jersey. Unless revised labeling is submitted to limit the use on peppers to bell peppers only, data on several varieties of smaller peppers (such as chili peppers) must be developed from field trials in California and Texas/Arizona/New Mexico. Residue data reflecting both soil and foliar application at the maximum application rates are required unless revised labeling is submitted that limits application only to on of the methods. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. Revised labeling must specify the number of applications permitted per growing season for the foliar application method and the interval between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on peppers must be removed from labeling.

46/ Residue data in the form of a pesticide petition to support the current tolerance of 3.0 ppm on tomatoes must be submitted. The data must be developed from field trials in California, Florida, Ohio/Pennsylvania, New Jersey, Indiana, Michigan, and South Carolina/Tennessee. Adequate greenhouse trials (including storage stability data for lindane residues on tomatoes and details of the analytical methodology) are also required to support the fumigation use on this crop. Since higher residues may occur in cherry tomatoes, residue data on cherry tomatoes reflecting an adequate geographical representation are required. If tomatoes are to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. The residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Revised labeling must be submitted that specify the total number of applications permitted per season and the interval between these applications. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on tomatoes must be removed from labeling.

47/ Since tomatoes are processed into the feed items, wet and dry pomace, and the food items, puree and juice, residue data on these commodities are required in order to determine whether food and feed additive tolerances needed.

48/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (cucumbers, melons - cantaloupe or muskmelon, and summer squash) and the metabolism of lindane in plants is not adequately understood.

49/ Residue data in the form of a pesticide petition to support the current tolerance of 3.0 ppm on cucumbers must be submitted. The data must be developed from field trials in California, Florida, Texas, Michigan, New York/New Jersey, North Carolina/South Carolina, and Ohio. Adequate greenhouse trials (including storage stability data for lindane residues on cucumbers and details of the analytical methodology) are also required to support the fumigation use on this crop. If cucumbers are to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes of

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49/ [Continued from previous page] application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Revised labeling must be submitted that specifies the total number of applications permitted per season and the interval between these applications. Current labeling stipulates a pre-harvest interval (PHI) of 1 day but also includes a limitation against use after blossoms open. A pre-harvest interval, supported by residue data, must be established to eliminate this disparity. Labeling for those products composed of lindane in combination with maneb must reflect the more stringent precautions applicable to each pesticide. A pre-harvest interval, supported by residue data, must be established which is compatible with both pesticides. Recommendations for tank mixes of lindane with other pestcides not having established tolerances on cucumbers must be removed from labeling.

50/ Residue data in the form of a pesticide petition to support the current tolerance of 3.0 ppm on melons must be submitted. Data on cantaloupes must be developed from field trials in California, Texas/Arizona, Indiana, Michigan, and Georgia/South Carolina. Data on watermelons must be developed from field trials in Florida/Georgia, Texas, and California. If melons are to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. Residue data must include results from treatment with EC formulation, since residue would be expected to be higher from that type of formulation. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Revised labeling must be submitted that specifies the total number of applications permitted per season and the interval between these applications. Labeling for those products composed of lindane in combination with maneb must reflect the more stringent precautions applicable to each pesticide. A pre-harvest interval (PHI), supported by residue data, must be established which is compatible with both pesticides. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on melons must be removed from labeling.

51/ Residue data in the form of a pesticide petition to support the current tolerance of 3.0 ppm on pumpkins must be submitted. Data must be developed from field trials in California, Texas, Illinois, New Jersey, and Oregon. If pumpkins are to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. Residue data must include results from treatment with EC formulation, since residue would be expected to be higher from that type of formulation. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Revised labeling must be submitted that specifies the total number of applications permitted per season and the interval [Continued on next page]

51/ [Continued from previous page] between these applications. Current labels stipulate a pre-harvest interval (PHI) of 1 day, but also include a limitation against use after blossoms open. A pre-harvest interval, supported by residue data, must be established to eliminate this disparity. Labeling for those products composed of lindane in combination with maneb must reflect the more stringent precautions applicable to each pesticide. A pre-harvest interval, supported by residue data, must be established which is compatible with both pesticides. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on pumpkins must be removed from labeling.

52/ Residue data in the form of a pesticide petition to support the current tolerance of 3.0 ppm on squash must be submitted. Data on summer squash must be developed from field trials in California, Florida, Michigan, Texas, Oregon, New York/New Jersey/Massachusetts, and Georgia/South Carolina. Data on at least two different kinds of winter squash are required. The data on winter squash should be generated from areas where these squash are grown commercially. Alternatively, revised labeling can be submitted in which the types of squash to be treated with lindane are limited to those for which adequate residue data have been generated. If squash are to be subjected to all 3 modes of application (soil, foliar, and seed treatments), then residue data reflecting collectively all 3 modes at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portions of the plant, then residue data reflecting soil and foliar applications collectively at the maximum application rates will be adequate. Residue data must include results from treatment with EC formulation, since residue would be expected to be higher from that type of formulation. If treatment is limited to either seed, soil, or foliar application (rather than all 3 modes), then revised labeling will be required. Revised labeling must be submitted that specifies the total number of applications permitted per season and the interval between these applications. Labeling for those products composed of lindane in combination with maneb must reflect the more stringent precautions applicable to each pesticide. A pre-harvest interval (PHI), supported by residue data, must be established which is compatible with both pesticides. Current labels indicate a 1 day PHI, but they also include a note that late foliar application may result in reduction of quality at harvest. A revised PHI, supported by adequate residue data, should be proposed that would eliminate the quality loss problem. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on squash must be removed from labeling.

53/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (apples and pears) and the metabolism of lindane in plants is not adequately understood.

54/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on apples must be submitted. Data on apples must be developed from field trials in California, Michigan, New York, Pennsylvania/West Virginia, Virginia/North Carolina, and Washington. Since apples are to be subjected to both foliar and bark treatment, residue data reflecting foliar and bark at the maximum application rates are required. Residue data must include results from treatment with EC formulation, since residues would be expected to be higher from that type of formulation. If treatment is limited to either foliar or bark treatment (rather than both), then revised labeling will be required. The 60 day pre-harvest interval (PHI) does not appear to be compatible with the prohibition against application after first cover. [Continued on next page]

54/ [Continued from previous page] Treatment 60 days before harvest would generally occur after first cover. Revised labeling is required to resolve this discrepancy. If the PHI is related to the growth stage (such as first cover), residue data from rapidly maturing apple varieties would also be required. The dosage rate for foliar application should be expressed in terms of pounds per 100 gallons (lbs/100 gal) and as a range in pounds per acre (lbs/acre). The dosage in terms of lbs/acre is based on the number of gallons of dilute spray needed to spray one acre of trees to the point of runoff or the equivalent amount of product per acre in concentrate sprays. A prohibition against grazing livestock on cover crops beneath treated trees must be added to all lindane end-use products with directions for use on apples. Revised labeling must be submitted that specifies the total number of applications permitted per season and the interval between these applications for both the foliar treatment and the bark treatment methods of application.

55/ Residue data are required for wet and dry apple pomace in order to determine whether feed additive tolerances are needed. Residue data are required for apple juice in order to determine whether a food additive tolerance is needed.

56/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on pears must be submitted. Data on pears must be developed from field trials in California, Michigan, New York, and Washington. Since pears are to be subjected to both foliar and bark treatment, residue data reflecting foliar and bark at the maximum application rates are required. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. If treatment is limited to either foliar or bark treatment (rather than both), then revised labeling will be required. The dosage rate for foliar application should be expressed in terms of pounds per 100 gallons (lbs/100 gal) and as a range in pounds per acre (lbs/acre). The dosage in terms of lbs/acre is based on the number of gallons of dilute spray needed to spray one acre of trees to the point of runoff or the equivalent amount of product per acre in concentrate sprays. A prohibition against grazing livestock on cover crops beneath treated trees must be added to all lindane end-use products with directions for use on pears. Revised labeling must be submitted that specifies the total number of applications permitted per season and the interval between these applications for both the foliar treatment and the bark treatment methods of application.

57/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (sour or sweet cherries, peaches, and plums or fresh prunes) and the metabolism of lindane in plants is not adequately understood.

58/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on apricots must be submitted. Data on apricots must be developed from field trials in California, Michigan, Colorado, Arizona, and Washington/Oregon/Idaho. The dosage rate for bark application should be expressed in terms of pounds per 100 gallons (lbs/100 gal) and as a range in pounds per acre (lbs/acre). The dosage in terms of lbs/acre is based on the number of gallons of dilute spray needed to spray one acre of trees to the point of runoff. A prohibition against grazing livestock on cover crops beneath treated trees must be added to lindane end-use products with directions for use on apricots. Revised labeling must be submitted that specifies the total number of applications permitted per season and the interval between these applications for the bark treatment method of application.

59/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on cherries must be submitted. Data on cherries must be developed from field trials in California, Michigan, New York/Pennsylvania Utah/Montana/Idaho, and Washington/Oregon. Since cherries are to be subjected to both foliar and bark treatment, residue data reflecting foliar and bark at the maximum application rates are required. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. If treatment is limited to either foliar or bark treatment (rather than both), then revised labeling will be required. The dosage rate for both foliar and bark applications should be expressed in terms of pounds per 100 gallons (lbs/100 gal) and as a range in pounds per acre (lbs/acre). The dosage in terms of lbs/acre is based on the number of gallons of dilute spray needed to spray one acre of trees to the point of runoff (for foliar and bark treatment) or the equivalent amount of product per acre in concentrate sprays (for foliar application only). A prohibition against grazing livestock on cover crops beneath treated trees must be added to lindane end-use products with directions for use on cherries. Revised labeling must be submitted that specifies the total number of foliar applications permitted per season and the interval between these applications.

60/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on nectarines must be submitted. The data must be developed from field trials in California, Pennsylvania, South Carolina, Texas, and Washington. Appropriate labeling describing acceptable application methods and rates, and any limitations, pertaining to the use of lindane on nectarines must also be submitted.

61/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on peaches must be submitted. Data on peaches must be developed from field trials in California, Michigan, New Jersey/Pennsylvania, Georgia/South Carolina and Washington. Since peaches are to be subjected to both foliar and bark treatment, residue data reflecting foliar and bark at the maximum application rates are required. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. If treatment is limited to either foliar or bark treatment (rather than both), then revised labeling will be required. With some varieties of peaches, the 60 day pre-harvest interval (PHI) is not compatible with the instructions not to apply later than 7 days after shuck split. Applications 60 days before harvest could take place as long as 2 months after shuck split for some varieties. This discrepancy must be eliminated by revising the PHI, which should reflect residue data from several varieties of peaches with different maturation dates. The dosage rate for both foliar and bark applications should be expressed in terms of pounds per 100 gallons (lbs/100 gal) and as a range in pounds per acre (lbs/acre). The dosage in terms of lbs/acre is based on the number of gallons of dilute spray needed to spray one acre of trees to the point of runoff (for foliar and bark treatment) or the equivalent amount of product per acre in concentrate sprays (for foliar application only). A prohibition against grazing livestock on cover crops beneath treated trees must be added to lindane end-use products with directions for use on peaches. Revised labeling must be submitted that specifies the total number of foliar applications permitted per season and the interval between these applications.

62/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on plums must be submitted. Data on peaches must be developed from field trials in California, Idaho, Michigan, and Washington/ Oregon. Since plums are to be subjected to both foliar and bark treatment, residue data reflecting foliar and bark at the maximum application rates are required. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. If treatment is limited to either foliar or bark treatment (rather than both), then revised labeling will be required. The dosage rate for both foliar and bark applications should be expressed in terms of pounds per 100 gallons (lbs/100 gal) and as a range in pounds per acre (lbs/acre). The dosage in terms of lbs/acre is based on the number of gallons of dilute spray needed to spray one acre of trees to the point of runoff (for foliar and bark treatment) or the equivalent amount of product per acre in concentrate sprays (for foliar application only). A prohibition against grazing livestock on cover crops beneath treated trees must be added to lindane end-use products with directions for use on peaches. Revised labeling must be submitted that specifies the total number of foliar applications permitted per season and the interval between these applications.

63/ Since plums can be processed in dried prunes, residue data on dried prunes is required in order to determine if a food additive tolerance is needed.

64/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on fresh prunes must be submitted. Data on fresh prunes must be developed from field trials in California, Idaho, Michigan, and Washington/ Oregon. Since fresh prunes are to be subjected to both foliar and bark treatment, residue data reflecting foliar and bark at the maximum application rates are required. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. If treatment is limited to either foliar or bark treatment (rather than both), then revised labeling will be required. The dosage rate for both foliar and bark applications should be expressed in terms of pounds per 100 gallons (lbs/100 gal) and as a range in pounds per acre (lbs/acre). The dosage in terms of lbs/acre is based on the number of gallons of dilute spray needed to spray one acre of trees to the point of runoff (for foliar and bark treatment) or the equivalent amount of product per acre in concentrate sprays (for foliar application only). A prohibition against grazing livestock on cover crops beneath treated trees must be added to lindane end-use products with directions for use on fresh prunes. Revised labeling must be submitted that specifies the total number of foliar applications permitted per season and the interval between these applications.

65/ Since fresh prunes are processed in dried prunes, residue data on dried prunes is required in order to determine if a food additive tolerance is needed.

66/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on quince must be submitted. The data must be developed from field trials in California. Appropriate labeling describing acceptable application methods and rates, and any limitations, pertaining to the use of lindane on quince must also be submitted.

67/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (blackberry or other Rubus, blueberry, cranberry, grapes, and strawberry) and the metabolism of lindane in plants is not adequately understood.

68/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on grapes must be submitted. Data on grapes must be developed from field trials in California, Michigan, New York, Washington, and North Carolina. These data should reflect the maximum current use. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. Revised labeling must be submitted that gives the application rate in terms of pounds of active ingredient per acre and that specifies the total number of applications permitted per season and the interval between these applications.

69/ Residue data are required on wet and dry grape pomace and raisin waste in order to determine whether feed additive tolerances are needed. Residue data are required on grape juice and raisins in order to determine whether food additive tolerances are necessary.

70/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on strawberries must be submitted. Data on strawberries must be developed from field trials in California, Florida, New York/Ohio, Oregon/Washington, Indiana/Michigan, and Louisianna. Since strawberries are to be subjected to both soil and foliar treatment, residue data reflecting both soil and foliar treatments at the maximum application rates are required. Residue data must include results from treatment with EC formulations, since residues would be expected to be higher from that type of formulation. If treatment is limited to either soil or foliar treatment (rather than both), then revised labeling will be required. Revised labeling that specifies the total number of foliar applications permitted per season and the interval between these application must be submitted.

71/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (almonds, pecans, and English walnuts) and the metabolism of lindane in plants is not adequately understood.

72/ Residue data in the form of a pesticide petition to support the current tolerance of 0.01 ppm on pecans must be submitted. Data on pecans must be developed from field trials in Louisianna, Texas/New Mexico/Oklahoma. These data should reflect the maximum current use and application of representative formulations. In order to effectively extract residues of lindane, the nuts should be ground in an Ultra Centifugal Mill before extraction with a Polyton or Omni-Mixer. Samples should not be frozen and stored prior to analysis because no storage stability data for residues of lindane on pecans are currently available.

73/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (corn - fresh sweet corn and dried field corn, rice, sorghum, and wheat) and the metabolism of lindane in plants is not adequately understood.

74/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance (supported by adequate residue data from Idaho/Montana/North Dakota/Washington California, Minnestoa, and Maryland) should be proposed for residues of lindane on barley (i.e., the second generation of barley grain) arising from the treatment of barley (seed) grain. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that barley grain treatment is a non-food use that does not require a tolerance. Since barley forage, hay, and straw are feed items, it will also be necessary either to submit residue data on forage, hay, [Continued on next page]

74/ [Continued from previous page] and straw grown from treated seed or to submit revised labeling that prohibits the feeding of barley forage, hay, and straw to livestock. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on barley must be removed from labeling.

75/ If detectable amounts of lindane are found in barley (that is, in second generation barley grain) after seed treatment at exaggerated rates, a milling study and data on residue in the germ will also be necessary. If the required plant metabolism studies indicate the presence of other residues besides parent lindane, and if significant levels of these metabolites are found in second generation barley grain, then a processing study would be required to determine if these residues concentrate in processed commodities.

76/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on corn grown from treated seed. Since the use is on the commodity "corn", residue data for field corn, sweet corn, and popcorn are required. Residue data on sweet corn (including kernals plus cobs with husks removed) grown from treated seed are required from Florida, California, New York, Texas, Ohio/Pennsylvania, Massachusetts/New Jersey, Oregon/Washington/Idaho, Michigan/Minnesota/Wisconsin, and Illinois. Residue data on field corn grown from treated seed are required from all areas across the country. Residue data on popcorn grown from treated seed are required from Indiana/Illinois/Ohio, Kentucky, Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that corn grain treatment is a non-food use that does not require a tolerance. Residue data on forage and fodder from second generation popcorn and field corn are required as well as residue data on forage from second generation sweet corn. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on corn must be removed from labeling.

77/ If detectable lindane residues on second generation corn result from seed treatment at exaggerated rates, a milling study will be required. If the required plant metabolism studies indicate the presence of other residues besides parent lindane, and if significant levels of these metabolites are found in second generation corn, then a processing study would be required to determine if these residues concentrate in processed commodities. Since it has been shown that lindane does not survive the hydrogenation or deodorization steps, a food additive tolerance will not be necessary for refined corn oil from second generation corn, if it is established that corn oil is always deodorized and/or hydrogenated during the refining process.

78/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on oats grown from treated grain (seed). Residue data on oats grown from treated seed are required from Kansas/Iowa, Michigan/Wisconsin/Illinois, North Dakota/South Dakota/Nebraska, and Pennsylvania/Ohio. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that oat grain treatment is a non-food use that does not require a tolerance. Since oat forage,hay and straw are feed items, will also be necessary to either submit residue data on forage, hay, and straw grown from treated oat seed or to submit revised labeling that prohibits the feeding of oat forage, hay, and straw to livestock. Since oat hulls are a feed item, residue data are required for oat hulls in order to determine whether a feed additive tolerance is necessary. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on oats must be removed from labeling.

79/ If detectable lindane residues on second generation oats result from seed treatment at exaggerated rates, a milling study will be required. If the required plant metabolism studies indicate the presence of other residues besides parent lindane, and if significant levels of these metabolites are found in second generation oats, then a processing study would be required to determine if these residues concentrate in processed commodities.

80/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on rye grown from treated grain (seed). Residue data on rye grown from treated seed are required from field trials in Georgia/North Carolina/South Carolina, Michigan/Minnesota, North Dakota/South Dakota/Nebraska, and Pennsylvania/New York. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that rye seed treatment is a non-food use that does not require a tolerance. Since rye forage and straw are feed items, it will also be necessary either to submit residue data on forage and straw grown from treated rye seed or to submit revised labeling that prohibits the feeding of rye forage and straw to livestock. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on rye must be removed from labeling.

81/ If detectable lindane residues on second generation rye result from seed treatment at exaggerated rates, a milling study will be required. If the required plant metabolism studies indicate the presence of other residues besides parent lindane, and if significant levels of these metabolites are found in second generation rye, then a processing study would be required to determine if these residues concentrate in processed commodities.

82/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on sorghum grown from treated grain (seed). Residue data on sorghum grown from treated seed are required from field trials in Texas/Arkansa/Oklahoma, Kansas/Missouri, and Georgia/Mississippi. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that sorghum seed treatment is a non-food use that does not require a tolerance. If seeds of sweet sorghum are to be treated with lindane, then a separate tolerance for this commodity would be required. Since sorghum forage, fodder, and hay are feed items, it will also be necessary either to submit resiue data on sorghum forage, fodder, and hay grown from treated seed or to submit revised labeling that prohibits the feeding of rye forage and straw to livestock. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on sorghum must be removed from labeling.

83/ If detectable lindane residues on second generation sorghum result from seed treatment at exaggerated rates, a milling study will be required. If the required plant metabolism studies indicate the presence of other residues besides parent lindane, and if significant levels of these metabolites are found in second generation sorghum, then a processing study would be required to determine if these residues concentrate in processed commodities.

84/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on wheat grown from treated grain (seed). Residue data on wheat grown from treated seed are required from field trials in all areas across the country. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that wheat seed treatment is a non-food use that does not require a tolerance. Since wheat forage, straw, and hay are feed items, it will also be necessary either to submit residue data on forage, straw, and hay grown from treated wheat seed or to submit revised labeling that prohibits the feeding of wheat forage and straw to livestock. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on wheat must be removed from labeling.

85/ If detectable lindane residues on second generation wheat result from seed treatment at exaggerated rates, a milling study will be required. Although some milling studies on wheat have been carried out, these studies involved grain which had been treated and then milled. Spiking and processing a commodity is not generally acceptable when the pesticide is systemic. Since lindane is systemic, the residues found in second generation wheat would result from translocation and not just from surface residues. If the required plant metabolism studies indicate the presence of other residues besides parent lindane, and if significant levels of these metabolites are found in second generation wheat, then a processing study would be required to determine if these residues concentrate in processed commodities.

86/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (bermuda grass, bluegrass, and bromegrass or fescue) and the metabolism of lindane in plants is not adequately understood.

87/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on sudangrass grown from treated seed. Residue data on sudangrass grown from treated seed are required from field trials in California and Texas. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that sudangrass seed treatment is a non-food use that does not require a tolerance. Since sudangrass hay is a feed item, it will also be necessary to submit residue data on sudangrass hay grown from treated seed. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on sudangrass must be removed from labeling.

88/ A group tolerance is not appropriate at this time because adequate residue data are not available for representative crops of this group (alfalfa and clover) and the metabolism of lindane in plants is not adequately understood.

89/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on alfalfa grown from treated seed. Residue data on alfalfa seed, forage, and hay grown from treated seed are required from field trials in all major alfalfa growing areas of the country. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that alfalfa [Continued on next page]

89/ [Continued from previous page] seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on alfalfa must be removed from labeling.

90/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on clover grown from treated seed. Residue data on fresh clover and hay grown from treated seed are required from field trials in all major clover growing areas of the country. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that clover seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on clover must be removed from labeling.

91/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on asparagus must be submitted. The data must be developed from field trials in California, Michigan, and Washington/Oregon. Revised end-use product labeling must be submitted revising the limitation against using beyond the seedling stage, which is too vague, to a prohibition against using lindane on plants beyond a certain height. Also, the total number of application during the post-cutting stage and the interval between applications should be specified.

92/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on avocados must be submitted. The data must be developed from field trials in California and Florida. Appropriate labeling describing the application method and rate, and any limitations, pertaining to the use of lindane on avocados must also be submitted.

93/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on second generation cottonseed grown from treated seed. Residue data on cottonseed grown from treated seed are required from field trials in Texas/Arizona/Oklahoma, California, and Louisiana/Mississippi/Arkansa. The residue data should reflect maximum application rates on undelinted seed. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that cottonseed treatment is a non-food use that does not require a tolerance. Since cotton forage is a feed item, it will also be necessary either to submit residue data on forage grown from treated seed or to submit revised labeling that prohibits feeding cotton forage to livestock. A label restriction prohibiting the feeding of cotton gin trash to livestock is needed. Recommendations for tank mixtures of lindane with other pesticides not having established tolerances on cotton must be removed from labeling.

94/ If real residues of lindane occur on cottonseed as a result of seed treatment at exaggerated rates, a processing study including analyses of hulls, meal, soapstock, and oil will be required. If concentration occurs in any by-product, food/feed additive tolerances will be necessary. A food additive tolerance will not be necessary for refined cottonseed oil from second generation cotton, since it has been shown that residues of lindane do not survive the hydrogenation of deodorization step in the refinement of oil. If the required plant metabolism studies indicate the presence of other residues besides parent, and if significant levels of these metabolites are found in second generation cottonseed, then a processing study will be required to determine if these residues concentrate in processed commodities.

95/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on flax grown from treated seed. Residue data on flax grown from treated seed are required from field trials in North Dakota/South Dakota/Montana, Michigan/Wisconsin, and Texas. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that flax seed treatment is a non-food use that does not require a tolerance. Since flax straw is a feed item, it will also be necessary either to submit residue data on flax straw grown from treated seed or to submit revised labeling that prohibits feeding flax straw to livestock. Recommendations for tank mixtures of lindane with other pesticides not having established tolerances on flax must be removed from labeling.

96/ If real residues of lindane occur on second generation flax seed as a result of seed treatment at exaggerated rates, a processing study will be required. Analyses of hulls and meal will be required. If concentration occurs in any by-product, food/feed additive tolerances will be necessary. If the required plant metabolism studies indicate the presence of other residues besides parent, and if significant levels of these metabolites are found in second generation flax seed, then a processing study will be required to determine if these residues concentrate in processed commodities.

97/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on guavas must be submitted. The data must be developed from field trials in Hawaii. Appropriate labeling describing the application method and rate, and any limitations, pertaining to the use of lindane on guavas must also be submitted.

98/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on mangoes must be submitted. The data must be developed from field trials in Hawaii and Florida. Appropriate labeling describing the application method and rate, and any limitations, pertaining to the use of lindane on mangoes must also be submitted.

99/ Residue data in the form of a pesticide petition to support the current tolerance of 3.0 ppm on mushrooms must be submitted. The data must be developed from field trials in California, Illinois/Missouri, and Pennsylvania. Appropriate labeling describing the application method and rate, and any limitations, pertaining to the use of lindane on mushrooms must also be submitted.

100/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on okra must be submitted. The data must be developed from field trials in Florida/Georgia/Alabama and Texas. Since both seed treatment and soil applications are permitted, residue data reflecting collectively both modes of application at the maximum application rates are required. If it can be shown that seed treatment results in negligible residues in the edible portion of the plant, then residue data reflecting soil application at the maximum application rate would be adequate. Alternatively, if use is limited either to seed or to soil application, then revised labeling showing only one method of application will be required. Recommendations for tank mixes of lindane with other pesticides not having established tolerances on okra must be removed from labeling.

101/ Residue data in the form of a pesticide petition to support the current tolerance of 1.0 ppm on pineapple must be submitted. The data must be developed from field trials in Hawaii. Residue data on pineapples, bran, and forage (including the crowns), and pineapple juice (see processed food data requirements below) utilizing current analytical methodology are needed. The residue data should reflect the maximum application rates of representative formulations and should reflect pre-plant application, drip irrigation and foliar application. If treated forage is not be fed to livestock, a revised label with such a prohibition is required. Recommendations for tank mixtures of lindane with other pesticides not having established tolerances on pineapples must not appear on labeling.

102/ Residue data on pineapple juice utilizing current analytical methodology are needed to determine if residues concentrate in the juice, which would necessitate a food additive tolerance. The residue data should reflect the maximum application rate to Hawaiian pineapples and should reflect preplant application, drip irrigation and foliar application. Representative formulations should be applied to generate the residue data.

103/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on (second generation) safflower seed grown from treated safflower seed. Residue data are required from field trials in Arizona, California, and South Dakota/Montana. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that safflower seed treatment is a non-food use that does not require a tolerance. Recommendations for tank mixtures of lindane with other pesticides not having established tolerances on safflower seed must be removed from labeling.

104/ If real residues of lindane occur on (second generation) safflower seed as a result of seed treatment at exaggerated rates, a processing study will be required. Analyses of meal and oil will be required. If concentration occurs in any by-product, food/feed additive tolerances will be necessary. If the required plant metabolism studies indicate the presence of other residues besides parent, and if significant levels of these metabolites are found in second generation safflower seed, then a processing study will be required to determine if these residues concentrate in processed commodities.

105/ Seed treatment is considered to be a food use, unless a radiolabeled study has shown there is no transfer of radioactive residues from the seed to the aerial portions of the plant. An appropriate tolerance should be proposed for residues of lindane on (second generation) sunflower seed grown from treated sunflower seed. Residue data are required from field trials in Texas, North Dakota/South Dakota/Montana, California, and Kansas/Colorado. Alternatively, a radiolabeled study showing the degree of transfer of residues from the seed to aerial portions of the plant could be used to support the position that sunflower seed treatment is a non-food use that does not require a tolerance. Since sunflower forage is a food item, it will also be necessary either to submit residue data on sunflower forage grown from treated seed or to submit revised labeling that prohibits feeding sunflower forage to livestock. Recommendations for tank mixtures of lindane with other pesticides not having established tolerances on sunflower seed must be removed from labeling.

106/ If real residues of lindane occur on second generation sunflower seed as a result of seed treatment at exaggerated rates, a processing study including analyses of hulls, meal and oil will be required. If concentration occurs in any by-product, food/feed additive tolerances will be necessary. [Continued on next page]

106/ [Continued from previous page] A food additive tolerance will not be necessary for refined sunflower oil from second generation sunflower seed, if it is established that sunflower oil is always deodorized and/or hydrogenated during the refining process. It has been shown that residues of lindane do not survive the hydrogenation of deodorization step in the refinement of oil. If the required plant metabolism studies indicate the presence of other residues besides parent, and if significant levels of these metabolites are found in second generation sunflower seed, then a processing study will be required to determine if these residue concentrate in processed commodities.

107/ The use of lindane on tobacco does not require a tolerance or an exemption from tolerance, but data are needed to assess the exposure to residues resulting from the use of lindane. There are no lindane residue data on tobacco which reflect the present uses. Residue data from field trials in Kentucky/Virginia/Tennessee, and Georgia/North Carolina/South Carolina are required. Residue data reflecting application of the EC formulations should be included, as residues would be expected to be higher from that type of formulation. Since tobacco plants can be subjected to both foliar and transplant water treatment, residue data reflecting both foliar and transplant treatment at the maximum application rates are needed. If use is limited to foliar or transplant treatment (rather than both), revised labeling with this restriction must be submitted. A residue profile on tobacco smoke is also required. If residues of 0.1 ppm or more are found on green freshly harvested tobacco, pyrolysis products from the active ingredient must be characterized. The total number of foliar applications and the interval between application should be specified in a revised label.

108/ ALL METHODS OF APPLICATION TO LIVESTOCK

Available residue data do not support the tolerance of 7 ppm for residues of lindane in the fat from cattle, goats, horses, and sheep and 4 ppm in the fat from hogs because much of the data were generated by questionable or unspecified methods and most of the studies did not specify the conditions under which the samples were stored or give the duration of the storage period before analysis. Residue data using adequate methodology must be submitted for residues of lindane in animal fat resulting from the various methods of application and at appropriate dosages. Unless the requested animal metabolism studies establish the absence of radioactive residues in other tissues, residue data on meat and meat by-products are needed in order to establish tolerances on these commodities for residues of parent lindane. If animal metabolism studies reveal the presence of other residues of toxicological concern besides parent lindane, residue data will also be required for these residues.

SPRAYS AND DIPS

The results of previous studies indicating the presence of lindane residues in cattle fat following spray application of 0.075% lindane but not after application of 0.03% lindane need to be verified. The spray and dip treatments impose no limit to the number of applications which can be made to livestock. A revised label is required which specifies the number of applications permitted and the interval between applications. The treatment rate should be supported by adequate residue data. Pre-slaughter intervals of 30 days are imposed following spray treatment and 60 days following dip treatment. [Continued on next page]

108/ [Continued from previous page] Pre-slaughter intervals greater than 3 days are not practical since animals may be sent to slaughter over an extended period of time, and, if sold, the pesticidal history of the animals may not be known to the new owner. Residue data reflecting pre-slaughter intervals of 3 days or less are required for spray and dip applications.

The current use permits the spraying and dipping of hogs. No residue data are available for the dipping of hogs, but some of the available data on cattle indicate that residues resulting from dipping could be higher than from spray treatment. Residue data reflecting analyses of fat tissue from hogs which have been dipped at the maximum application rate are required.

Available data indicate that unshorn lambs have much higher residues in the fat after dipping than shorn sheep. More residue data on unshorn lambs and sheep reflecting the maximum treatment rate are required to support the tolerance.

Since dips and sprays may be formulated with toxaphene, labeling must include the more stringent precautions and restrictions associated with each of the pesticide components involved in a combination product.

PRESSURIZED SPRAYS

No residue data are available for the residue levels of lindane in livestock fat following spot treatment for screw-worms with the 3% lindane pressurized spray. No pre-slaughter interval is imposed following pressurized spray application. Residue data reflecting use of the 3% pressurized lindane spray are required to support the tolerance. Fat samples reflecting various pre-slaughter intervals (including a zero day pre-slaughter interval) should be analyzed so that the build-up and decay of lindane residues as a function of time after treatment can be evaluated. The number of 3% lindane pressurized spray applications for the spot treatment of screwworm infested livestock is not specified. Revised label is required which specifies the number of applications permitted. The treatment rate should be supported by adequate residue data.

SPONGE TREATMENT

Although there are no residue data for animal sponge treatment, the requested residue data for the use of the pressurized spray treatment for the spot treatment of screw-worms would cover residues arising from this application. The total number of application for this use should be specified in a revised label. In order to extrapolate from the requested residue data on the 3% lindane pressurized spray, the dosage for the animal sponge treatment in terms of percent lindane is required.

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108/ [Continued from previous page]

DUSTS

There are no residue data available reflecting dust treatment of livestock. Since the current use imposes no pre-slaughter interval, residue data reflecting dust treatment with a zero day pre-slaughter interval are required to support the tolerance. Since dust treatments may be formulated with methoxychlor, labeling must include the more stringent precautions and restrictions associated with each of the pesticide components involved in a combination product.

BACKRUBBERS, DUST BAGS, and RUBBING POSTS

Residue data for backrubber use, dust bag treatment, or rubbing post treatment are required. Since the animals would have unlimited access to these devices, the experiment should be designed to maximize exposure. Current labels indicate pre-slaughter intervals of 30 days following exposure to back rubbers. Pre-slaughter intervals greater than 3 days are not practical as animals may be sent to slaughter over an extended period of time, and, if sold, the pesticidal history of the animals may not be known to the new owner. Residue data reflecting pre-slaughter intervals of 3 days or less are required for backrubber applications.

109/ No tolerance has been established for residues of lindane in milk. Available residue data on the 3% pressurized spray for the spot treatment of screw-worms indicate that lindane residues are detected in milk up to 29 days after a second treatment and 24 days after a single treatment. A tolerance for lindane residues in milk will have to be established unless revised labeling is submitted for this type of product that prohibits use on lactating dairy animals. Dairy cattle and dairy goats may be exposed to lindane by several direct or indirect methods, therefore, a tolerance level for lindane residues in milk, based on adequate residue data, must be proposed. This proposed tolerance should be high enough to include residues arising from ingestion as well as dermal treatments applicable to dairy cattle and goats (i.e. pressurized spray treatment and animal sponge treatment, dust treatment, and dust bag, back rubber or rubbing post applications). Alternatively, labeling bearing restrictions against any method of application to lactating dairy animals (cattle and goats) should be submitted. However, since it is not possible for the Agency to estimate the lindane dietary burden imposed upon livestock until the required residue data on crops and feed items have been submitted and reviewed, a tolerance for residues of lindane in milk may have to be established based upon dietary intake, even if all direct applications were prohibited. Labeling for all lindane end-use products with directions for use on live stock premises or farm buildings must bear a prohibition against application in dairy barns.

110/ Tolerances have not been established for residues of lindane in poultry or eggs, however, it may be necessary to establish such tolerances if significant levels of lindane are found in poultry feed items. Labeling of all lindane end-use products with directions for use on livestock premises or farm buildings must bear a prohibition against application in poultry houses.

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.130 Environmental Fate						
DEGRADATION STUDIES-LAB:						
161-1 - Hydrolysis	TGAI or PAIRA	A,B,E,F,G,H,K,L	No	-	Yes	9 Months
Photodegradation						
161-2 - In water	TGAI or PAIRA	A,B,G	No	-	Yes	9 Months
161-3 - On Soil	TGAI or PAIRA	A,G	No	-	Yes	9 Months
161-4 - In Air	TGAI or PAIRA	A	No	-	Reserved4/	
METABOLISM STUDIES-LAB:						
162-1 - Aerobic Soil	TGAI or PAIRA	A,B,E,G,K	No	-	Yes	27 Months
162-2 - Anaerobic Soil	TGAI or PAIRA	A	No	-	Yes	27 Months
162-3 - Anaerobic Aquatic	TGAI or PAIRA	-	-	-	No5/	
162-4 - Aerobic Aquatic	TGAI or PAIRA	-	-	-	No5/	
MOBILITY STUDIES:						
163-1 - Leaching and Adsorption/Desorption	TGAI or PAIRA	A,B,E,F,G,H,K,L	No	-	Yes	12 Months
163-2 - Volatility (Lab)	TEP	A,E,F,J,K	No	-	Yes	12 Months
163-3 - Volatility (Field)	TEP	A,E,F,J,K	No	-	Reserved6/	

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.130 Environmental Fate (Continued)						
DISSIPATION STUDIES-FIELD:						
164-1 - Soil	TEP	A,B,H	No	-	Yes	27 Months
164-2 - Aquatic (Sediment)	TEP	5/	-	-	No5/	
164-3 - Forestry	TEP	G,L	No	-	Yes7/	27 Months
164-4 - Combination and Tank Mixes	-					
164-5 - Soil, Long-term	TEP	A	No	-	8/	
ACCUMULATION STUDIES:						
165-1 - Rotational Crops (Confined)	PAIRA	A	No	-	Yes	39 Months
165-2 - Rotational Crops (Field)	TEP	A	No	-	Reserved9/	
165-3 - Irrigated Crops	TEP	A	No	-	Yes7/	39 Months
165-4 - In Fish	TGAI or PAIRA	A,B,G,L	No	-	Yes	12 Months
165-5 - In Aquatic Non-target Organisms	TEP	G,L	No	-	10/	

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 3/ Submission
§158.130 Environmental Fate (Continued)						
RE-ENTRY STUDIES:						
132-1 Foliar Dissipation	TEP	A11/	No	-	Yes	27 Months
EXPOSURE STUDIES:						
Applicators	TEP	12/, 13/, 14/, 15/	No	-	Yes	6 Months
Residents	TEP	16/, 17/	No	-	Yes	6 Months
Human skin/clothing	1% Dust	18/	No	-	Yes	6 Months

1/ Composition: TGAI = Technical Grade of the Active Ingredient; PAIRA = Pure Active Ingredient, Radio-labelled; TEP = Typical End-Use Product.

2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Non-Food, C=Aquatic, Food Crop, D = Aquatic, Non-Food; E = Greenhouse, Food Crop; F = Greenhouse, Non-Food; G = Forestry; H = Domestic Outdoor; I = Indoor; J = Commercial Indoor; K = Animals/Premises; L = Lumber

3/ Due dates refers to number of months following receipt of this Registration Standard.

4/ Reserved, pending receipt and evaluation of data on photodegradation in water, photodegradation on soil, and aerobic soil metabolism.

5/ No registered aquatic uses.

6/ Reserved, pending receipt and evaluation of laboratory volatility data.

7/ May be combined with tests for field accumulation, aquatic non-target organisms, per 165-5.

8/ Required only if residues found, per 164-1, exceed 50% of applied at time of subsequent application.

9/ Reserved, pending receipt and evaluation of studies from confined rotational crop study.

10/ Required only if laboratory fish accumulation study show a potential for residue accumulation.

§158.130 Environmental Fate (Continued)

11/ For each crop whose agricultural practice requires prolonged, substantial contact with pesticide treated surfaces, the registrant is required to propose an acceptable re-entry interval based on data on dissipation of foliar dislodgeable residues of lindane (a declining curve), on human exposure to those residues, and on toxicity of lindane. Registrants may submit protocols to the Agency for approval prior to initiating studies.

12/ Applicator exposure data must be submitted to support the farmer planter box method of seed treatment. Within 90 days of receipt of this Guidance Document, registrants must submit protocols for the appropriate exposure studies. Results of the exposure studies must be submitted within 6 months of the Agency's approval of proposed protocols.

13/ Applicator exposure data must be submitted to support the livestock spray application uses. Within 90 days of receipt of this Guidance Document, registrants must submit protocols for the appropriate exposure studies. Results of the exposure studies must be submitted within 6 months of the Agency's approval of protocols.

14/ Applicator exposure data must be submitted to support the structural application uses. Within 90 days of receipt of this Guidance Document, registrants must submit protocols for the appropriate exposure studies. Results of the exposure studies must be submitted within 6 months of the Agency's approval of protocols.

15/ Applicator exposure data must be submitted to support the dog wash, dog dust, and dog shampoo uses. Within 90 days of receipt of this Guidance Document, registrants must submit protocols for the appropriate exposure studies. Results of the exposure studies must be submitted within 6 months of the Agency's approval of the protocols.

16/ Air monitoring data is required to support the structural application uses of lindane. Within 90 days of receipt of this Guidance Document, registrants must submit a protocol for an air monitoring study. Results of the study must be submitted within 6 months of the Agency's approval of the protocol.

17/ Air monitoring data is required to determine the exposure of residents following the treatment of dogs by lindane wash, dust, or shampoo. Within 90 days of receipt of this Guidance Document, registrants must submit protocols for air monitoring studies for the exposure of residents following the various treatment methods. Results of the studies must be submitted within 6 months of the Agency's approval of the protocols.

18/ Exposure data must be submitted to support the use on human skin/clothing by the military. Within 90 days of receipt of this Guidance Document, registrants must submit protocols for the appropriate exposure studies. Results of the exposure studies must be submitted within 6 months of the Agency's approval of the protocols.

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 3/ Submission
§158.135 Toxicology						
ACUTE TESTING:						
81-1 - Acute Oral Toxicity (rat)	TGAI	All	Partially	00049330 00109141	No	
81-2 - Acute Dermal Toxicity (rabbit)	TGAI	All	Partially	00049330 00109141	No	
81-3 - Acute Inhalation Toxicity (rat)	TGAI	All	No	-	Yes	9 Months
81-6 - Dermal Sensitization (guinea pig)	TGAI	All	No	-	Yes	9 Months
81-7 - Delayed Neurotoxicity (hen)	N.A.					
SUBCHRONIC TESTING:						
82-1 - 90-Day Feeding: - Rodent (rat)	TGAI	All	Yes	00128356	No	
- Non-rodent (dog)	TGAI	All	No	-	No4/	
82-2 - 21-Day Dermal (rabbit)	TGAI	All	No	-	Yes5/	12 Months
82-3 - 90-Day Dermal (rabbit)	TGAI	-	No	-	Yes6/	15 Months
82-4 - 90-Day Inhalation (rat)	TGAI	E,F,I	No	-	Yes7/	15 Months
82-5 - 90-Day Neurotoxicity (hen)	N.A.					

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.135 Toxicology - Continued						
CHRONIC TESTING:						
83-1 - Chronic Toxicity 2 species:						
- Rodent (rat)	TGAI	A,E	No	-	Yes	50 Months
- Non-rodent (dog)	TGAI	A,E	Yes	GS0315011 GS0315012 GS0315013	No	
83-2 - Oncogenicity 2 species:						
- Rat	TGAI	A,E	Partially	00142564 00105313 GS0315016 GS0315017	Yes	50 Months
- Mouse	TGAI	A,E	Yes	GS0315017 GS0315018 GS0315019 GS0315020 GS0315021 GS0315022 00078916	No	
83-3 - Teratogenicity 2 species						
- Rat	TGAI	All	Yes	GS0315024	No	
- Rabbit	TGAI	All	Yes	GS0315025	No	
83-4 - Reproduction (rat) 2-generation	TGAI	A,E	Yes	GS0315026	No	

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.135 Toxicology - Continued						
MUTAGENICITY TESTING						
84-2 - Gene Mutation (Ames Test)	TGAI	All	Yes	00142715	No	
84-3 - Structural Chromosomal Aberration	TGAI	All	Yes	00143513	No	
84-4 - Other Genotoxic Effects	TGAI	All	Yes	00143513	No	
SPECIAL TESTING						
85-1 - General Metabolism	PAI or PAIRA	A,E	Yes	00128538 GS0315031	No	
- Blood Dyscrasias	TGAI	All	No	-	Yes8/	
- Dermal Absorption	PAI or PAIRA	All	Yes	00031050	No	

1/ Composition: PAI = Pure Active Ingredient; PAIRA = Pure Active Ingredient, Radiolabelled

2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Non-Food; C = Aquatic, Food Crop; D = Agautic, Non-Food; E = Greenhouse, Food Crop; F = Greenhouse, Non-Food; G = Forestry; H = Domestic Outdoor; I = Indoor

3/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.

4/ See Chronic Toxicity (dog).

5/ Required to support use patterns that do not require protective clothing and which might result in repeated human skin contact (such as the use on cucurbits).

6/ Required to support the use involving application to human clothing.

7/ Required to support the greenhouse (food and non-food crops) and indoor uses and also the use on human clothing.

8/ Registrants responsible for developing generic data must meet with the Agency to develop an acceptable protocol and to establish an appropriate time frame for this study.

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.145 Wildlife and Aquatic Organisms						
AVIAN AND MAMMALIAN TESTING						
70-1 - Special Test	TEP	A	No	-	Reserved4/	
71-1 - Acute Avian Oral Toxicity	TGAI	A,G	Partially	00020560**	Yes5/	9 Months
71-2 - Avian Subacute Dietary Toxicity				-		
- Upland Game Bird	TGAI	A,G	Yes	00022923*	No	
- Waterfowl	TGAI	A,G	Yes	00022923*	No	
- Upland Game Bird	TEP	A	No	-	Yes6/	9 Months
- Passerine Bird	TEP	A	No	-	Yes6/	9 Months
71-3 - Wild Mammal Toxicity	TGAI	A,G	No	-	No	
71-4 - Avian Reproduction	TGAI					
- Upland Game Bird	TGAI	A	No	-	Reserved7/	
- Waterfowl	TGAI	A	No	-	Reserved7/	
71-5 - Simulated Field Testing						
- Birds	TEP	A	No	_	Reserved8/	
71-5 - Actual Field Testing						
- Birds	TEP	A	No	_	Reserved9/	

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.145 Wildlife and Aquatic Organisms (Continued)						
AQUATIC ORGANISM TESTING						
70-1 - Special Test	TEP	A	No	-	Yes[10/]	12 Months
72-1 - Acute Toxicity to Freshwater Fish						
- Coldwater Fish Species	TGAI	A,G	Yes	GS0144012*	No	
	TEP	A	No	-	Yes[11/]	9 Months
- Warmwater Fish Species	TGAI	A,G	Yes	GS0144012*	No	
	TEP	A	No	-	Yes[11/]	9 Months
72-2 - Acute Toxicity to Freshwater Invertebrates	TGAI	A,G	Yes	00097842** 05017538** GS0144012*	No	
	TEP	A	No	-	Yes[11/]	9 Months
72-3 - Acute Toxicity to Estuarine and Marine Organisms						
- Fish	TGAI	A	No	-	No	
- Mollusk	TGAI	A	No	-	Yes[12/]	12 Months
- Shrimp	TGAI	A	No	-	No	

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.145 Wildlife and Aquatic Organisms (Continued)						
AQUATIC ORGANISM TESTING (Continued)						
72-4 - Fish Early Life Stage						
- Estuarine	TGAI	A	No	-	No	
- Freshwater	TGAI	A	No	-	Yes13/	15 Months
- Aquatic Invertebrate Life-Cycle						
- Estuarine	TGAI	A	No	-	No	
- Freshwater	TGAI	A	No	-	Yes13/	15 Months
72-5 - Fish - Life-Cycle	TGAI	A	No	-	Reserved14/	
72-6 - Aquatic Organism Accumulation						
- Fish	TGAI	A	No	-	Yes15/	12 Months
72-7 - Simulated Field Testing - Aquatic Organisms	TEP	A	No	-	Reserved16/	
- Actual Field Testing - Aquatic Organisms	TEP	A	No	–	Reserved16/	

§158.145 Wildlife and Aquatic Organisms (Continued)

1/ Composition of test material: TGAI = Technical Grade of the Active Ingredient; PAI = Pure Active Ingredient; TEP = Typical End-use Product

2/ The Use Patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Non-Food; C = Aquatic, Food Crop; D = Aquatic, Non-Food; E = Greenhouse, Food Crop; F = Greenhouse, Non-Food; G = Forestry; H = Domestic Outdoor; I = Indoor

3/ All data must be submitted within the indicated time frame, based on the issue date of the Guidance Document.

4/ Residue monitoring of avian food items may be needed to determine if there should be further restrictions to reduce exposure of birds to lindane used in pecan orchards. The theoretical residue levels on vegetation and insects exceed the avian risk criterion. This data requirement is reserved pending Agency review of the required studies on hydrolysis (161-1), photodegradation in water (161-2), and photodegradation on soil (161-3).

5/ The bobwhite quail should be the test species for the avian single-dose oral acute toxicity studies.

6/ An additional set of avian dietary studies are needed to determine if birds will ingest lethal amounts of lindane when they consume treated seeds. The test species should be bobwhite quail and the red-winged blackbird. In one test the birds should be exposed to a diet of lindane treated seeds only, while in a companion test they should be exposed to a choice of lindane treated and untreated seeds. Within 90 days of the issue date of this Guidance Document, registrants must submit a proposed protocol for this study for Agency approval.

7/ This data requirement is reserved pending Agency review of the required studies on photodegradation in water (161-2) and photodegradation on soil (161-3), and the special residue monitoring study on avian food items (70-1).

8/ This data requirement is reserved pending Agency review of the required studies on hydrolysis (161-1), photodegradation in water (161-2), and photodegradation on soil (161-3), as well as certain of the avian studies (70-1, 71-1, 71-2, and 71-4).

9/ This data requirement is reserved pending Agency review of the required studies on hydrolysis (161-1), photodegradation in water (161-2) photodegradation on soil (161-3), as well as certain of the avian studies (70-1, 71-1, 71-2, and 71-4). If a field study is needed, an actual field test can be done rather than a simulated field test. Registrants must submit a proposed protocol for either study for Agency approval within 90 days of the date of notification by the Agency that such data is being required.

10/ Aquatic residue monitoring is needed to determine if aquatic organisms are exposed to lindane as a result of the use in pecan orchards. This monitoring study must include both a runoff study and a spray drift study (refer to 40 CFR 158.142) in order to determine the proportions of lindane residues entering the aquatic ecosystem from drift and from runoff. Within 90 days of the date of this Guidance Document, registrants must submit a proposed protocol for this study for Agency approval.

11/ Testing with a typical end-use product (TEP) is required when the acute toxicity to freshwater fish of the technical grade material is equal to or less than the Estimated Environmental Concentration (EEC) in the aquatic environment (such as for pecans and for soil and foliar applications on crops).

12/ The results from the acute toxicity test with mollusks will be used to determine the risk to endangered mollusks from the use of lindane on pecan orchards.

13/ This requirement is based on the acute toxicity to fish values of less than 1 milligram/liter and an Estimated Environmental Concentration (EEC) greater than 0.01 of any acute toxicity level to fish or aquatic invertebrates.

14/ This data requirement is reserved pending Agency review of the required studies on hydrolysis (161-1), photodegradation in water (161-2), photodegradation on soil (161-3), aquatic residue monitoring (70-1), fish early life stage (72-4), and aquatic invertebrate life-cycle (72-4).

15/ The fish accumulation study required under 165-4 will also satisfy this requirement.

16/ This data requirement is reserved pending Agency review of the required studies on hydrolysis (161-1), photodegradation in water (161-2), photodegradation on soil (161-3), aquatic residue monitoring (70-1), acute toxicity to freshwater fish (72-1), acute toxicity to freshwater invertebrates (72-2), fish early life stage (72-4), and aquatic invertebrate life-cycle (72-4). If the Agency determines that a field study is necessary, a simulated field study can be done rather than an actual field test. Registrants must submit a proposed protocol for either study for Agency approval within 90 days of the date of notification by the Agency that such data is being required.

* This study alone fulfills the data requirement.

** This study alone does not fulfill the data requirement.

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition[1]	Use Pattern	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission
§158.150 Plant Protection						
121-1 - TARGET AREA PHYTOTOXICITY	EP		No	-	No[2]	
NONTARGET AREA PHYTOTOXICITY						
TIER I						
122-1 - Seed Germination/ Seedling Emergence	TGAI		No	-	No[2]	
122-1 - Vegetative Vigor	TGAI		No	-	No[2]	
122-2 - Aquatic Plant Growth	TGAI		No	-	No[2]	
TIER II						
123-1 - Seed Germination/ Seedling Emergence	TGAI		No	-	No[2]	
123-1 - Vegetative Vigor	TGAI		No	-	No[2]	
123-2 - Aquatic Plant Growth	TGAI		No	-	No[2]	
TIER III						
124-1 - Terrestrial Field	TEP		No	-	No[2]	
124-2 - Aquatic Field	TEP		No	-	No[2]	

1/ Composition: TGAI = Technical grade of the active ingredient; TEP = Typical end-use product. EP = End-use product.
2/ These requirements are generally waived unless it is believed there is a phototoxicity problem.

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisty This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data Submission 3/
§158.155 Nontarget Insect						
NONTARGET INSECT TESTING - POLLINATORS:						
141-1 - Honey bee acute contact toxicity	TGAI	A4/	Yes	00036935 05001991	No	
141-2 - Honey bee - toxicity of residues on foliage	TEP	A4/	No	-	Yes5/	15 Months
141-4 - Honey bee subacute feeding study	[Reserved] 6/					
141-5 - Field testing for pollinators	TEP	A4/	No	-	No7/	
NONTARGET INSECT TESTING - AQUATIC INSECTS:						
142-1 - Acute toxicity to aquatic insects	[Reserved] 8/					
142-1 - Aquatic insect life-cycle study	[Reserved] 8/					
142-3 - Simulated or actual field testing for aquatic insects	[Reserved] 8/					

TABLE A

GENERIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 3/ Submission
§158.155 Nontarget Insect (Continued)						
NONTARGET INSECT TESTING - PREDATORS AND PARASITES:						
143-1 thru 143-3	[Reserved] 8/					

1/ Composition: TGAI = Technical Grade of the Active Ingredient; TEP = Typical End-use Product.
2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Non-Food;
C = Aquatic, Food Crop; D = Aqautic, Non-Food; E = Greenhouse, Food Crop; F = Greenhouse, Non-Food;
G = Forestry; H = Domestic Outdoor; I = Indoor
3/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
4/ The forestry use pattern is not included in the listing of application sites dependent upon this specific data requirement because the forestry application to trunks does not expose beneficial insects.
5/ As data from acute contact test indicate high toxicity, data on residual toxicity are required.
6/ Requirement reserved pending development of test methodology.
7/ Requirement applied on a case-by-case basis. Data reviewed to date do not indicate the need for a study.
8/ Reserved pending Agency decision as to whether data requirement should be established.

IV. REQUIREMENT FOR SUBMISSION OF PRODUCT-SPECIFIC DATA

Note: Unless stated otherwise in Section II, Regulatory Position and Rationale, this Section applies only to manufacturing-use products, not to end-use products.

A necessary first step in determining which statements must appear on your product's label is the completion and submission to EPA of product-specific data* listed on the form entitled "Product Specific Data Report" (EPA Form 8580-4, Appendix III-1) to fill gaps identified by EPA concerning your product. Under the authority of FIFRA sec. 3(c)(2)(B), EPA has determined that you must submit these data to EPA in order to reregister your product(s). All of these data must be submitted not later than six months after you receive this guidance document.

Table B - Product-Specific Data Requirements for Manufacturing Use Products - lists the product specific data you must submit. Data that are required to be submitted are identified in the column of those tables entitled "Must Data By Submitted Under §3(c)(2)(B)".

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*/ Product specific data pertain to data that support the formulation which is marketed; it usually includes product chemistry data and acute toxicity data.

TABLE B

PRODUCT SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING LINDANE

Guideline Citation and Name of Test	Test Substance	Guidelines Status	Are Data Required? Yes	No	Data Must Be Submitted With Time Frames Listed Below 1/
§158.120 Product Chemistry					
Product Identity:					
61-1 - Product Identity and Disclosure of Ingredients	MP2/	R	☐	☒	
61-2 - Description of Beginning Materials and Manufacturing Process	MP	R	☒	☐	6 Months
61-3 - Discussion of Formation of Unintentional Ingredients3/	MP	R	☒	☐	6 Months
Analysis and Certification of Product Ingredients					
62-1 - Preliminary Analysis4/	MP	R	☒	☐	12 Months
62-2 - Certification of Limits	MP	R	☒	☐	12 Months
62-3 - Analytical Methods to Verify Certified Limit	MP	R	☒	☐	12 Months
Physical and Chemical Characteristics					
63-2 - Color	MP	R	☐	☒	
63-3 - Physical State	MP	R	☐	☒	
63-4 - Odor	MP	R	☐	☒	

TABLE B

PRODUCT SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING LINDANE

Guideline Citation and Name of Test	Test Substance	Guidelines Status	Are Data Required? Yes	No	Data Must Be Submitted With Time Frames Listed Below 1/
§158.120 Product Chemistry (Continued)					
Physical and Chemical Characteristics (Continued)					
63-7 - Density, Bulk Density, or Specific Gravity	MP	R	☐	☒	
63-12 - pH	MP	NA	☐	☒	
Other Requirements:					
64- 1 - Submittal of samples	MP	CR	☒ 4/	☐	

MP = Manufacturing-use Product; R = Required; CR = Conditionally Required; NA = Not Applicable
1/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
2/ The technical (T) also serves as a manufacturing-use product since lindane is not manufactured in the United States of America.
3/ The discussion must specifically address the potential for formation of dioxins and dibenzofurans.
4/ Analysis must identify and quantify all components present at greater than 0.1%, plus identification and
5/ If samples are needed the Agency will request them.

TABLE B

PRODUCT SPECIFIC DATA REQUIREMENTS FOR LINDANE

Data Requirement	Composition 1/	Use Pattern	Does EPA Have Data To Satisfy This Requirement?	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B) ?	Time Frame For Data 2/ Submission
§158.135 Toxicology						
ACUTE TESTING:						
81-1 - Acute Oral Toxicity - Rat	MP3/	All	No	-	Yes	9 Months
81-2 - Acute Dermal Toxicity - Rabbit	MP	All	No	-	Yes	9 Months
81-3 - Acute Inhalation Toxicity - Rat	MP	All	No	-	Yes	9 Months
81-4 - Primary Eye Irritation	MP	All	No	-	Yes	9 Months
81-5 - Primary Dermal Irritation	MP	All	No	-	Yes	9 Months
81-6 - Dermal Sensitization	MP	All	No	-	Yes	9 Months

1/ MP = Manufacturing-use Product
2/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
3/ The technical (T) also serves as a manufacturing-use product since lindane is not manufactured in the United States of America. All formulation intermediates are included in the category of manufacturing-use products.

V. SUBMISSION OF REVISED LABELING

Note: This section applies to end-use products only to the extent described in Section II, Regulatory Position and Rationale. Otherwise, the following information pertains exclusively to manufacturing-use products.

FIFRA requires each product to be labeled with accurate, complete and sufficient instructions and precautions, reflecting the results of data concerning the product and its ingredients. Labeling requirements are set out in 40 CFR 162.10 (see Appendix IV-1) and are summarized for products containing this active ingredient as part of this Guidance Document (See Appendix IV-2). Applications submitted in response to this notice must include draft labeling for Agency review.

If you fail to submit revised labeling information complying with this section (supplemented by requirements described in Section II, Regulatory Position and Rationale), EPA may issue a Notice of Intent to Cancel the registration under FIFRA sec. 6(b)(1).

A. Label Contents

40 CFR 162.10 requires that certain specific labeling statements appear at certain locations on the label. This is referred to as format labeling. Specific label items listed below are keyed to Appendix IV-2.

Item 1. PRODUCT NAME - The name, brand or trademark is required to be located on the front panel, preferably centered in the upper part of the panel. The name of a product will not be accepted if it is false or misleading.

Item 2. COMPANY NAME AND ADDRESS - The name and address of the registrant or distributor is required on the label. The name and address should preferably be located at the bottom of the front panel or at the end of the label text.

Item 3. NET CONTENTS - A net contents statement is required on all labels or on the container of the pesticide. The preferred location is the bottom of the front panel immediately above the company name and address, or at the end of the label text. The net contents must be expressed in the largest suitable unit, e.g., "1 pound 10 ounces" rather than "26 ounces." In addition to English units, net contents may be expressed in metric units. See Appendix IV-1. [40 CFR 162.10(d)]

Item 4. EPA REGISTRATION NUMBER - The registration number assigned to the pesticide product must appear on the label, preceded by the phrase "EPA Registration No.," or "EPA Reg. No." The registration number must be set in type of a size and style similar to other print on that part of the label on which it appears and must run parallel to it. The registration number and the required identifying phrase must not appear in such a manner as to suggest or imply recommendation or endorsement of the product by the Agency. See Appendix IV-1. [40 CFR 162.10(e)]

Item 5. EPA ESTABLISHMENT NUMBER - The EPA establishment number, preceded by the phrase "EPA Est." is the final establishment at which the product was produced, and may appear in any suitable location on the label or immediate container. It must also appear on the wrapper or outside container of the package if the EPA establishment number on the immediate container cannot be clearly read through such wrapper or container. See Appendix IV-1. [40 CFR 162.10(f)]

Item 6A. INGREDIENTS STATEMENT - An ingredients statement is required on the front panel. The ingredients statement must contain the name and percentage by weight of each active ingredient and the total percentage by weight of all inert ingredients. The preferred location is immediately below the product name. The ingredients statement must run parallel with, and be clearly distinguished from, other text on the panel. It must not be placed in the body of other text. See Appendix IV-1. [40 CFR 162.10(g)]

Item 6B. POUNDS PER GALLON STATEMENT - For liquid agricultural formulations, the pounds per gallon of active ingredient must be indicated on the label.

Item 7. FRONT LABEL PRECAUTIONARY STATEMENTS - Front panel precautionary statements must be grouped together, preferably within a block outline. The table below shows the minimum type size requirements for various size labels.

Size of label (front panel) in square inches	Signal Word (all capital letters) Minimum Type Size	"KEEP OUT OF REACH OF CHILDREN" Minimum Type Size
5 and under	6 point	6 point
above 5 to 10	10 point	6 point
above 10 to 15	12 point	8 point
above 15 to 30	14 point	10 point
over 30	18 point	12 point

Item 7A. CHILD HAZARD WARNING STATEMENT - The statement "KEEP OUT OF REACH OF CHILDREN" must be located on the front panel above the signal word, except where contact with children during distribution or use is unlikely. See Appendix IV-1. [40 CFR 162.10(h)(1)(ii)]

Item 7B. SIGNAL WORD - The signal word ("DANGER", "WARNING", or "CAUTION") is required on the front panel immediately below the child hazard warning statement. See Appendix IV-1. [40 CFR 162.10 (h)(1)(i)]

Item 7C. SKULL & CROSSBONES AND WORD "POISON" - On products assigned a toxicity Category I on the basis of oral, dermal, or inhalation toxicity, the word "Poison" shall appear on the label in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word POISON. See Appendix IV-1. [40 CFR 162.10(h)(1)(i)]

Item 7D. STATEMENT OF PRACTICAL TREATMENT - A statement of practical treatment (first aid or other) shall appear on the label of pesticide products in toxicity Categories I, II, and III. See Appendix IV-1. [40 CFR 162.10(h)(1)(iii)]

Item 7E. REFERRAL STATEMENT - The statement "See Side (or Back) Panel for Additional Precautionary Statements" is required on the front panel for all products, unless all required precautionary statements appear on the front panel. See Appendix IV-1. [40 CFR 162.10(h)(1)(iii)]

Item 8. SIDE/BACK PANEL PRECAUTIONARY LABELING - The precautionary statements listed below must appear together on the label under the heading "PRECAUTIONARY STATEMENTS." The preferred location is at the top of the side or back panel preceding the directions for use, and it is preferred that these statements be surrounded by a block outline. Each of the three hazard warning statements must be headed by the appropriate hazard title. See Appendix IV-1. [40 CFR 162.10 (h)(2)].

Item 8A. HAZARDS TO HUMANS AND DOMESTIC ANIMALS - Where hazard(s) exists to humans or domestic animals, precautionary statements are required indicating the particular hazard(s), the route(s) of exposure and the precautions to be taken to avoid accident, injury or damage. See Appendix IV-1. [40 CFR 162.10 (h)(2)(i)]

Item 8B. ENVIRONMENTAL HAZARDS - Where a hazard exists to non-target organisms excluding humans and domestic animals, precautionary statements are required stating the nature of the hazard and the appropriate precautions to avoid potential accident, injury, or damage. See Appendix IV-1. [40 CFR 162.10 (h)(2)(ii)]

Item 8C. PHYSICAL OR CHEMICAL HAZARDS

1. Flammability statement. Precautionary statements relating to flammability of a product are required to appear on the label if it meets the criteria in Appendix IV-3. The requirement is based on the results of the flashpoint determinations and flame extension tests required to be submitted for all products. These statements are to be located in the side/back panel precautionary statements section, preceded by the heading "Physical/Chemical Hazards." Note that no signal word is used in conjunction with the flammability statements.

2. Criteria for declaration of non-flammability. The following criteria will be used to determine if a product is non-flammable:

   a. A "non-flammable gas" is a gas (or mixture of gases) that will not ignite when a lighted match is placed against the open cylinder valve.

   b. A "non-flammable liquid" is one having a flashpoint greater than 350°F (177°C).

   c. A "non-flammable aerosol" is one which meets the following criteria:

      i. The flame extension is zero inches;

      ii. There is no flashback; and

      iii. The flashpoint of the non-volatile liquid component is greater than 350°F (177°C).

3. Declaration of non-flammability. Products which meet the criteria for non-flammability specified above may bear the notation "non-flammable" or "non-flammable (gas, liquid, etc.)" on the label. It may appear as a substatement to the ingredients statement, or on a back or side panel, but shall not be highlighted or emphasized (as with an inordinately large type size) in any way that may detract from precaution.

4. Other physical/chemical hazard statements. When chemistry data demonstrate hazards of a physical or chemical nature other than flammability, appropriate statements of hazard will be prescribed. Such statements may address hazards of explosivity, oxidizing or reducing capability, or mixing with other substances to produce toxic fumes.

Item 9A. RESTRICTED USE CLASSIFICATION - FIFRA sec. 3(d) requires that all pesticide formulations/uses be classified for either general or restricted use. Products classified for restricted use may be limited to use by certified applicators or persons under their direct supervision (or may be subject to other restrictions that may be imposed by regulation).

In this Registration Standard, the Agency has indicated certain uses are to be restricted. If your product bears any of the restricted uses, the draft label(s) submitted to the Agency as part of your application must reflect this determination (see below).

If you do not believe that your product should be classified for restricted use, you must submit any information and rationale with your application for reregistration. During the Agency's review of your application, your proposed classification determination will be evaluated in accordance with the provisions of 40 CFR 162.11(c). You will be notified of the Agency's classification decision.

Classification Labeling Requirements

If this Guidance Document indicates that your product has been classified for restricted use, the following label requirements apply:

1. Front panel statement of restricted use classification.

    a. The statement "Restricted Use Pesticide" must appear at the top of the front panel of the label. The statement must be set in type of the same minimum size as required for human hazard signal word (see table in 40 CFR 162.10(h)(1)(iv)

    b. Directly below this statement must appear the cancer hazard warning as detailed in the "Labeling Requirements for End-Use Products".

    c. Directly under the cancer hazard warning, a summary statement of the terms of restriction must appear :

    > "For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification."

2. Some but not all uses restricted. If Section II, the Regulatory Position and Rationale, states that some uses are classified for restricted use, and some are unclassified, several courses of action are available:

a. You may label the product for restricted use. If you do so, you may include on the label uses that are unrestricted, but you may not distinguish them on the label as being unrestricted.

b. You may delete all restricted uses from your label and submit draft labeling bearing only unrestricted uses.

c. You may "split" your registration, i.e., register two separate products with identical formulations, one bearing only unrestricted uses, and the other bearing restricted uses. To do so, submit two applications for reregistration, each containing all forms and necessary labels. Both applications should be submitted simultaneously. Note that the products will be assigned separate registration numbers.

Item 9B. MISUSE STATEMENT - All products must bear the misuse statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." This statement appears at the beginning of the directions for use, directly beneath the heading "Directions for Use".

Item 10A. REENTRY STATEMENT - If a reentry interval has been established by the Agency, it must be included on the label. Additional worker protection statements may be required in accordance with PR Notice 83-2, March 29, 1983.

Item 10B. STORAGE AND DISPOSAL BLOCK - All labels are required to bear storage and disposal statements. These statements are developed for specific containers, sizes, and chemical content. These instructions must be grouped and appear under the heading "Storage and Disposal" in the directions for use. This heading must be set in the same type sizes as required for the child hazard warning. Refer to Appendix IV-4 to determine the pesticide and container disposal instructions appropriate for your products.

Item 10C. DIRECTIONS FOR USE - Directions for use must be stated in terms which can be easily read and understood by the average person likely to use or to supervise the use of the pesticide. When followed, directions must be adequate to protect the public from fraud and from personal injury and to prevent unreasonable adverse effects on the environment. See Appendix IV-1. [40 CFR 162.10]

B. Collateral Labeling

Bulletins, leaflets, circulars, brochures, data sheets, flyers, or other written or graphic printed matter which is referred to on the label or which is to accompany the product are termed collateral labeling. Such labeling may not bear claims or representations that differ in substance from those accepted in connection with registration of the product. It should be made part of the response to this Standard and submitted for review.

VI. INSTRUCTIONS FOR SUBMISSION

A. For Manufacturing-Use Products (MP) containing lindane as an active ingredient.

1. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division at the address given at the end of this section the "FIFRA Section 3(c)(2)(B) Summary Sheet" EPA Form 8580-1. Refer to Appendix II-3 with appropriate attachments.

If on the Summary Sheet, you commit to develop the data, request a minor chemical exemption, present arguments that a data requirement is not applicable, or submit protocols or modified protocols for Agency review, you must also submit a copy of the Summary Sheet (and any supporting information) to the Office of Compliance Monitoring, which will be monitoring the data generated in response to this notice. This information should be submitted to the Office of Compliance Monitoring at the address given at the end of this section. (NOTE - Actual data are not to be submitted to the Office of Compliance Monitoring, just the items identified above or a copy of the cover letter that accompanies your data submission to the Product Manager in the Registration Division.)

2. Within 6 months from receipt of this document you must submit to the Product Manager on the Registration Division:

a. Confidential Statement of Formula, EPA Form 8570-4.

b. Product Specific Data Report, EPA Form 8580-4 (Appendix III-1).

c. Two copies of any required product-specific data.

d. Two copies of draft labeling, including the label and associated brochures. If current labeling conforms to the requirements of this guidance document and the results of the short-term data, you may submit such labeling. End-use product labeling must comply specifically with the instructions in Section II (Regulatory Position and Rationale) of this Guidance Document. The labeling should be either typewritten text on 8-1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8-1/2 x 11 inch files. The draft label must indicate the intended colors of the final label, clear indication of the front panel label, and the intended type sizes of the text.

e. Evidence of compliance with data support requirements of FIFRA sec. 3(c)(1)(D). Refer to 40 CFR 152.80-152.99 for latest requirements.

3. Within the times set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. A copy of the cover letter that accompanies each data submission to the Product Manager, Registration Division, must also be submitted to the Office of Compliance Monitoring. If, for any reason, any test is delayed or aborted so that the agreed schedule cannot be met, or if a change in test protocol is indicated, notify the Product Manager, Registration Division, and the Office of Compliance Monitoring (at the addresses given at the end of this section) to request an extension of time or to request a change in test protocol.

B. For Manufacturing-Use Products containing lindane in combination with other active ingredients (other than solvents)

1. Within 90 days from receipt of this document, you must submit the "FIFRA Section 3(c)(2)(B) Summary Sheet," EPA Form 8580-1. Refer to Appendix II-3 with appropriate attachments.

If on the Summary Sheet, you commit to develop the data, request a minor chemical exemption, present arguments that a data requirement is not applicable, or submit protocols or modified protocols for Agency review, you must also submit a copy of the Summary Sheet (and any supporting information) to the Office of Compliance Monitoring, which will be monitoring the data generated in response to this notice. This information should be submitted to the Office of Compliance Monitoring at the address given at the end of this section. (NOTE - Actual data are not to be submitted to the Office of Compliance Monitoring, just the items identified above or a copy of the cover letter that accompanies your data submission to the Product Manager in the Registration Division.)

2. Within the times set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. A copy of the cover letter that accompanies each data submission to the Product Manager, Registration Division, must also be submitted to the Office of Compliance Monitoring. If, for any reason, any test is delayed or aborted so that the agreed schedule cannot be met, or if a change in test protocol is indicated, notify the Product Manager, Registration Division, and the Office of Compliance Monitoring (at the addresses given at the end of this section) to request an extension of time or to request a change in test protocol.

C. For End-Use Products (EP) containing lindane alone or in combination with other active ingredients:

1. Within 90 days from receipt of this document:

a. If you qualify for the formulators exemption (see PR Notice 85-3) you must submit the "Formulators Exemption Statement", Appendix II-5 and a current "Confidential Statement of Formula", EPA Form 8570-4, to support your request for the formulator's exemption.

b. If you do not qualify for the formulator's exemption (see PR Notice 85-3) you must submit the "FIFRA Section 3(c)(2)(B) Summary Sheet," EPA Form 8580-1, Appendix II-3, with appropriate attachments, and a current "Confidential Statement of Formula", EPA Form 8570-4.

If on the Summary Sheet, you commit to develop the data, request a minor chemical exemption, present arguments that a data requirement is not applicable, or submit protocols or modified protocols for Agency review, you must also submit a copy of the Summary Sheet (and any supporting information) to the Office of Compliance Monitoring, at the address given at the end of this section, which will be monitoring the data generated in response to this notice. (NOTE - Actual data should be submitted only to the Product Manager in the Registration Division)

2. Within 6 months from receipt of this document you must submit the following items to the Product Manager in the Registration Division:

a. Five (5) copies of draft labeling, including the label and associated brochures. If current labeling conforms to the requirements of this guidance document and the results of the short-term data, you may submit such labeling. End-use product labeling must comply specifically with the instructions in the Regulatory Position and Rationale of this Guidance Document. Labeling should be either typewritten text on 8 1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8 1/2 inch files. The draft label must indicate the intended colors of the final label, clear indication of the front panel label, and the intended type sizes of the text.

3. Within the times set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. A copy of the cover letter that accompanies each data submission to the Product Manager, Registration Division, must also be submitted to the

Office of Compliance Monitoring. If, for any reason, any test is delayed or aborted so that the agreed schedule cannot be met, or if a change in test protocol is indicated, notify the Product Manager, Registration Division, and the Office of Compliance Monitoring (at the addresses given at the end of this section) to request an extension of time or to request a change in test protocol.

D. Applications and other required information should be submitted to the following address:

George T. LaRocca
Product Manager (15)
Registration Division (TS-767C)
Office of Pesticide Programs
Environmental Protection Agency
401 M St., SW.
Washington, D.C. 20460
Phone No. (703) 557-2400

The address for submissions to the Office of Compliance Monitoring is:

Laboratory Data Integrity Program
Office of Compliance Monitoring (EN-342)
Environmental Protection Agency
401 M St., SW.
Washington, D.C. 20460

Appendix II-1

Guide to Use of This Bibliography

1. CONTENT OF BIBLIOGRAPHY. This bibliography contains citations of all studies considered relevant by EPA in arriving at the positions and conclusions stated elsewhere in the Standard. Primary sources for studies in this bibliography have been the body of data submitted to EPA and its predecessor agencies in support of past regulatory decisions. Selections from other sources including the published literature, in those instances where they have been considered, will be included.

2. UNITS OF ENTRY. The unit of entry in this bibliography is called a "study." In the case of published materials, this corresponds closely to an article. In the case of unpublished materials submitted to the Agency, the Agency has sought to identify documents at a level parallel to the published article from within the typically larger volumes in which they were submitted. The resulting "studies" generally have a distinct title (or at least a single subject), can stand alone for purposes of review, and can be described with a conventional bibliographic citation. The Agency has attempted also to unite basic documents and commentaries upon them, treating them as a single study.

3. IDENTIFICATION OF ENTRIES. The entries in this bibliography are sorted numerically by "Master Record Identifier," or MRID, number. This number is unique to the citation, and should be used at any time specific reference is required. It is not related to the six-digit "Accession Number" which has been used to identify volumes of submitted studies; see paragraph 4(d)(4) below for a further explanation. In a few cases, entries added to the bibliography late in the review may be preceded by a nine-character temporary identifier. These entries are listed after all MRID entries. This temporary identifier number is also to be used whenever specific reference is needed.

4. FORM OF ENTRY. In addition to the Master Record Identifier (MRID), each entry consists of a citation containing standard elements followed, in the case of material submitted to EPA, by a description of the earliest known submission. Bibliographic conventions used reflect the standards of the American National Standards Institute (ANSI), expanded to provide for certain special needs.

a. Author. Whenever the Agency could confidently identify one, the Agency has chosen to show a personal author. When no individual was identified, the Agency has shown an identifiable laboratory or testing facility as author. As a last resort, the Agency has shown the first submitter as author.

b. Document Date. When the date appears as four digits with no question marks, the Agency took it directly from the document. When a four-digit date is followed by a question mark, the bibliographer deduced the date from evidence in the document. When the date appears as (19??), the Agency was unable to determine or estimate the date of the document.

c. Title. In some cases, it has been necessary for Agency bibliographers to create or enhance a document title. Any such editorial insertions are contained between square brackets.

d. Trailing Parentheses. For studies submitted to the Agency in the past, the trailing parentheses include (in addition to any self-explanatory text) the following elements describing the earliest known submission:

(1) Submission Date. The date of the earliest known submission appears immediately following the word "received."

(2) Administrative Number. The next element, immediately following the word "under," is the registration number, experimental use permit number, petition number, or other administrative number associated with the earliest known submission.

(3) Submitter. The third element is the submitter, following the phrase "submitted by." When authorship is defaulted to the submitter, this element is omitted.

(4) Volume Identification (Accession Numbers). The final element in the trailing parentheses identifies the EPA Accession Number of the volume in which the original submission of the study appears. The six-digit accession number follows the symbol "CDL," standing for "Company Data Library." This Accession Number is in turn followed by an alphabetic suffix which shows the relative position of the study within the volume. For example, within Accession Number 123456, the first study would be 123456-A; the second, 123456-B; the 26th, 123456-Z; and the 27th, 123456-AA.

OFFICE OF PESTICIDE PROGRAMS
REGISTRATION STANDARD BIBLIOGRAPHY
Citations Considered to be Part of the Data Base Supporting Registration Under the Standard For Lindane

MRID	Citation
00020560	Schafer, E.W. (1972) The acute oral toxicity of 369 pesticidal, pharmaceutical and other chemicals to wild birds. Toxicology and Applied Pharmacology 21(?):315-330. (Also in unpublished submission received Apr 25, 1978 under 476-2180; submitted by Stauffer Chemical Co., Richmond, Calif.; CDL:233577-C)
00022923	Hill, E.F.; Heath, R.G.; Spann, J.W.; et al. (1975) Lethal Dietary Toxicities of Environmental Pollutants to Birds: Special Scientific Report--Wildlife No. 191. (U.S. Dept. of the Interior, Fish and Wildlife Service, Patuxent Wildlife Research Center; unpublished report)
00025685	Williams, S.; Mills, P.A.; McDowell, R.E. (1964) Residues in milk of cows fed rations containing low concentrations of five Chlorinated hydrocarbon pesticides. Journal of the Association of Official Analytical Chemists 47(6):1124-1128. (Also in unpublished submission received Nov 5, 1970 under 1F1060; submitted by Velsicol Chemical Corp., Chicago, Ill.; CDL:099195-AK)
00025690	Cummings, J.G.; Eidelman, M.; Turner, V.; et al. (1967) Residues in poultry tissues from low level feeding of five Chlorinated hydrocarbon insecticides to hens. Journal of the Association of Official Analytical Chemists 50(2):418-425. (Also in unpublished submission received Nov 5, 1970 under 1F1060; submitted by Velsicol Chemical Corp., Chicago, Ill.; CDL:099195-AQ)
00025707	Hill, K.R. (1970) Pesticide residues: IUPAC commission on terminal residues. Journal of the Association of Official Analytical Chemists 53(5):987-1003. (Also in unpublished submission received Nov 5, 1970 under 1F1060; submitted by Velsicol Chemical Corp., Chicago, Ill.; CDL:099195-BH)
00031050	Feldmann, R.J.; Maibach, H.I. (1974) Percutaneous penetration of some pesticides and herbicides in man. Toxicology and Applied Pharmacology 28(?):126-132. (Also in unpublished submission received Apr 23, 1980 under 10279-7; submitted by Purdue Frederick Co., Norwalk, Conn.; CDL:242321-R)
00032233	Dionne, E.; Cary, G.A.; Sleight, B.H., III (1980) Analytical Procedure for the Determination of Pesticides and PCB in Brine Shrimp Tissue. (Unpublished study received Feb 19, 1980 under 677-313; prepared by EG&G, Bionomics, submitted by Diamond Shamrock Agricultural Chemicals, Cleveland, Ohio; CDL:099247-K)

MRID	Citation
00036935	Atkins, E.L.; Greywood, E.A.; Macdonald, R.L. (1975) Toxicity of Pesticides and Other Agricultural Chemicals to Honey Bees: Laboratory Studies. By University of California, Dept. of Entomology. ?: UC, Cooperative Extension. (Leaflet 2287; published study.)
00045126	Claborn, H.V.; Radeleff, R.D.; Bushland, R.C. (1960) Pesticide Residues in Meat and Milk: A Research Report. (U.S. Agricultural Research Service, Entomology Research Div. and Animal Disease and Parasite Research Div., unpublished study; CDL:093429-S)
00049330	Gaines, T.B. (1969) Acute toxicity of pesticides. Toxicology and Applied Pharmacology 14:515-534. (Report no. 25529; also"In" unpublished submission received Jul 15, 1976 under 3125-EX-135; submitted by Mobay Chemical Corp., Kansas City, Mo.; CDL: 226487-E)
00060143	Saha, J.G. (1969) Letter sent to P.E. Porter dated Mar 10, 1969 [Metabolism of Lindane-14C by wheat plants]. (Canada, Dept. of Agriculture, Research Branch, unpublished study; CDL:091355-S)
00060150	Lichtenstein, E.P.; Fuhremann, T.W.; Scopes, N.E.A.; et al. (1967) Translocation of insecticides from soils into pea plants: Effects of the detergent LAS on translocation and plant growth. Journal of Agricultural and Food Chemistry 15(5):864-869. (Also in unpublished submission received Apr 5, 1969 under 9F0785; submitted by Shell Chemical Co., Washington, D.C.; CDL:091355-Z)
00075989	Chevron Chemical Company (1949) Milk Contamination Studies. (Unpublished study received Jul 24, 1952 under 239-399; CDL: 231161-B)
00079816	Thorpe, E.; Walker, A.I.T. (1973) The toxicology of dieldrin (HEOD). II. Comparative long-term oral toxicity studies in mice with dieldrin, DDT, phenobarbitone, [beta]-BHC and [gamma]-BHC. Food and Cosmetics Toxicology 11(3):433-442. (Also in unpublished submission received Sep 27, 1978 under 10182-EX-11; submitted by ICI Americas, Inc., Wilmington, Del.; CDL:235600-F)
00088048	Gyrisco, G.G.; Muka, A.A. comps. (1951) Report on a Preliminary Study on the Effects of Feeding Insecticide Treated Alfalfa Hay to Dairy Cattle. (Unpublished study received Feb 21, 1955 under PP0007; prepared by G.L.F. Soil Building Service and Cornell Univ., Depts. of Entomology, Animal Husbandry and Dairy Industry, submitted by Shell Chemical Corp., New York, N.Y.; CDL: 090081-U)
00088165	National Agricultural Chemicals Association (1955?) Supplementary Petition for Lindane Residue Tolerance. (Unpublished study received Jan 25, 1956 under PP0058; CDL:090056-A)

MRID	Citation
00089592	California Spray Chemical Corporation (1959) Residues of Lindane on Raw Agricultural Commodities. (Compilation; unpublished study received Apr 27, 1959 under PP0190; CDL:090218-B)
00089785	Muka, A.A.; Gyrisco, G.G., comp. (1952) Further Studies on the Feeding of Insecticide Treated Hay to Dairy Cattle. (Unpublished study received Sep 14, 1955 under PP0045; prepared by Cornell Univ., Dept. of Entomology and others, submitted by National Agricultural Chemicals Association, Falls Church, Va.; CDL:090042-H)
00097842	Sanders, H.O. (1969) Toxicity of Pesticides to the Crustacean Gammarus iacustris. By U.S. Fish and Wildlife Service, Fish-Pesticide Research Laboratory. Washington, D.C.: USFWS. (Technical papers of the Bureau of Sport Fisheries and Wildlife 25; Stauffer T-2214; published study; CDL:246020-K)
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00104441	Hornstein, I.; McGregor, W.; Sullivan, W. (1956) Lowering the volatility of lindane cattle sprays by addition of film-forming material. Agricultural and Food Chemistry 4(2):148-149. (Also in unpublished submission received May 14, 1970 under 0H2545; submitted by Hazleton Laboratories, Inc., Falls Church, VA; CDL: 221691-C)
00105413	Caro, J. (1969) Accumulation by plants of organochlorine insecticides from the soil. Phytopathology 59(9):1191-1197. (Also in unpublished submission received Nov 1, 1970 under unknown admin. no.; submitted by Hercules, Inc., Agricultural Chemicals, Wilmington, DE; CDL:005105-AM)
00109141	Midwest American Aerovap, Inc. (1951) Lindane: Animal Toxicity: [Biological Analysis]. (Compilation; unpublished study received on unknown date under unknown admin. no.; CDL:102026-C)

MRID	Citation
00118722	National Agricultural Chemicals Assoc. (1955) [Residues of Lindane in Agricultural and Cow Products]. (Compilation; unpublished study received Jan 24, 1956 under PP0058; CDL:092338-A)
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00118724	Collett, J.; Harrison, D. (1968) Lindane residues on pasture and in the fat of sheep grazing pasture treated with lindane prills. N.Z. Jl Agric. Res. 11:589-600. (Also in unpublished submission received May 12, 1969 under 9E0833; submitted by Office of the Commissioner, Washington, DC; CDL:093535-A)
00118725	National Agricultural Chemicals Assoc. (1955) The Results of Tests on the Amount of Residue Remaining, Including a Description of the Analytical Method Used: [Lindane]. (Compilation; unpublished study received on unknown date under PP0058; CDL: 098733-A)
00118739	Chevron Chemical Co. (1949) [BHC: Residues in Milk]. (Compilation; unpublished study received on unknown date under 239-229; CDL: 224548-A)
00128356	Suter, P.; Horst, K.; Luetkemeier, H. et al. (1983) 3 Months Toxicity Study in Rats with Lindane: RCC Project 005220. (Unpublished study received May 9, 1983 under unknown admin. no.; prepared by Research & Consulting Co. Ltd., Switz., submitted by Zoecon Corp., Palo Alto, CA; CDL:250340-A; 250341; 250342)
00128538	Sagelsdorff, P.; Lutz, W.; Schlatter, C. (1983) Covalent Binding to Mouse Liver DNA as Inconclusive Mechanism of Carcinogenic Action of Hexachlorocyclohexane Isomers. (Unpublished study received May 9, 1983 under unknown admin. no.; prepared by Institute of Toxicology, ETH, and Univ. of Zurich, Switz., submitted by Zoecon Corp., Palo Alto, CA; CDL:250339-A)
00142564	Fitzhugh, O.; Nelson, A.; Frawley, J. (1950) The chronic toxicities of technical benzene hexachloride and its alpha, beta and gamma isomers. J. Pharm. Exp. Therap. 100(1):59-66
00142715	Glatt, H. (1984) Mammalian Cell (V79) Mutagenicity Test on Lindane: Report No. SP 540-VT21. Unpublished study prepared by Univ. of Mainz, Institute of Toxicology. 11 p.
00143513	Guenard, J. (1984) In Vivo Sister Chromatid Exchange Assay in CFI-Mouse Bone Marrow Cells with Lindane (Intraperitoneal Injection): Project 025716. Unpublished study prepared by Research & Consulting Co. AG. 27 p.

MRID	Citation
05001991	Stevenson, J.H. (1978) The acute toxicity of unformulated pesticides to worker honey bees (Apis mellifera). Plant Pathology 27(1):38-40.
05002348	Burke, J.; Johnson, L. (1962) Investigations in the use of the micro-coulometric gas chromatograph for pesticide residue analysis. Journal of the Association of Official Agricultural Chemists 45(2):348-354.
05003005	Kovacs, M.F., Jr. (1966) Rapid detection of chlorinated pesticide residues by an improved TLC technique: 3 1/4 X 4" micro slides. Journal of the Association of Official Analytical Chemists 49(2):365-370.
05006312	Osadchuk, M.; Romach, M.; McCully, K.A. (1971) Cleanup and separation procedures for multipesticide residue analysis in monitoring and regulatory laboratories. Pages 357-381, in Pesticide Chemistry: Proceedings of the International IUPAC Congress of Pesticide Chemistry, 2nd; Feb 22-26, 1971, Tel-Aviv, Israel. Vol. 4: Methods in Residue Analysis. Edited by A.S. Tahori. New York: Gordon and Breach.
05017538	Sanders, H.O. (1972) Toxicity of Some Insecticides to Four Species of Malacostracan Crustaceans. Washington, D.C.: U.S. Dept. of the Interior, Fish and Wildlife Service. (U.S. Bureau of Sport Fisheries and Wildlife technical paper no. 66)
GS0144012	Johnson, W.; Finley, M. (1980) Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates. USDI Publication 137, Washington, D.C.
GS0315001	San Antonio, J. (1959) Demonstration of lindane and a lindane metabolite in plants by paper chromatography. Agricultural and Food Chemistry 7(5):322-325.
GS0315002	Herbst, M.; Leber, G. (1975) Investigations on Lindane either in Progress or Planned. Unpublished report prepared by Centre International d'Etudes du Lindane (C.I.E.L.), presented at EPA, Washington, D.C. on December 18, 1975. 17 p.
GS0315003	Itokowa, H.; Schallah, A.; Weisgerber, I.; et al. (1970) Beitraege zur Oekologischen Chemie: XXII. Metabolismus und Rueckstandverhalten von Lindan-14C in Hoeheren Pflanzen. [Contributions for Ecological Chemistry: XXII. Metabolism and Residual Characteristics of Lindane in Higher Plants]. Tetrahedron 26: 763-773. In German.
GS0315004	Chadwick, R.; Copeland, M.; Chadwick, C. (1978) Enhanced pesticide metabolism, a previously unreported effect of dietary fibre in mammals. Fd. Cosmet. Toxicol. 16:217-225.

MRID	Citation
GS0315005	Menzie, C. (1969) BHC. Pages 52-53 in Metabolism of Pesticides. U.S. Dept. of the Interior, Bureau of Sport Fisheries and Wildlife Special Scientific Report: Wildlife No. 127. Washington DC.
GS0315006	Menzie, C. (1974) BHC. Pages 54-56 in Metabolism of pesticides: An update. U.S. Dept. of the Interior, Fish and Wildlife Service. Special Scientific Report: Wildlife No. 184. Washington DC.
GS0315007	Ivey, M.; Roberts, R.; Mann, H.; et al. (1961) Lindane residues in chickens and eggs following poultry house sprays. J. Econ. Entomol. 54(3):487-488.
GS0315009	Treece, R.; Ware, G. (1965) Lindane residues on alfalfa and in milk. J. Econ. Entomol. 58(2):218-219.
GS0315010	Oehler, D.; Hogan, B.; Graham, O. (1970) Residues in milk following treatment of cows with lindane or Ronnel to control screw-worms. J. Econ. Entomol. 63(5):1467-1468.
GS0315011	Noel, P.; Rivett, K.; Sortwell, R.; et al. (1970) Lindane Toxicity Studies in Beagle Dogs: Initial Studies and Dietary Intake for 50 Weeks: Report No 3422/70/234. Unpublished study prepared by Huntingdon Research Centre, Huntingdon, UK. 15 p.
GS0315012	Noel, P.; Rivett, K.; Sortwell, R.; et al. (1970) Lindane Toxicity Studies in Beagle Dogs: Dietary Intake for 32 Weeks: Report No. 3720/70/532. Unpublished study prepared by Huntingdon Research Centre, Huntingdon, UK. 54 p.
GS0315013	Rivett, K.; Sortwell, R.; Spicer, E.; et al. (1970) Lindane Toxicity Studies in Beagle Dogs: Initial Studies and Dietary Intake for 104 Weeks: Report No. 4187/71/345. Unpublished study prepared by Huntingdon Research Centre, Huntingdon, UK. 156 p.
GS0315016	Ito, N.; Nagasaki, H.; Aoe, H.; et al. (1975) Brief communication: Development of hepatocellular carcinomas in rats treated with benzene hexachloride. J. Natl. Cancer Inst. 54(3):801-805.
GS0313017	National Cancer Institute (1977) Bioassay of Lindane for Possible Carcinogenicity. DHEW Publication No. (NIH) 77-814; Carcinogenesis Technical Report No. 14; National Institutes of Health, Bethesda, MD.
GS0315018	Nagasaki, H.; Tomii, S.; Mega, T.; et al. (1977) Carcinogenicity of Benzene Hexachloride (BHC). Pages 343-353 in Nakahara, W., et al, ed., "Proceedings of the 2nd International Symposium of the Princess Takamatsu Cancer Research Fund: Topics in Chemical Carcinogenesis". University Park Press.

MRID	Citation
GS0315019	Hanada, M.; Yutani, C.; Miyaji, T. (1973) Induction of hepatoma in mice by benzene hexachloride. GANN 64(5):511-513 and plate LXX.
GS0315020	Koellmer, H.; Weisse, I.; Stoetzer, H. (1975) Testing of the Substance Lindane for Cancerogenic Effects in Mice Using Oral Administration: Duration 80 Weeks: Celamerck Document No. L 139 E/75. Translation of unpublished report; original German text not available. 50 p.
GS0315021	Nobuyuki, I.; Nagasaki, H.; Arai, M.; et al. (1973) Histologic and ultrastructural studies on the hepatocarcinogenicity of benzene hexachloride in mice. J. Natl. Cancer Inst. 51(3):817-826.
GS0315022	Goto, M.; Hattori, M.; Miyagawa, T.; et al. (1972) Beitraege zur Oekologischen Chemie: II. Hepatoma-Bildung in Maeusen nach Verabreichung von HCH-Isomeren in hohen Dosen. [Contributions for Ecological Chemistry: II. Hepatoma development in mice after administration of HCH (BHC) isomers at high doses]. Chemosphere 1(6): 279-282. With unpublished translation.
GS0315024	Palmer, A.; Lovell, M. (1971) Effect of Lindane on Pregnancy of the Rat: Report No. 4307/71/463. Unpublished study prepared by Huntingdon Research Centre, Huntingdon, UK. 36 p.
GS0315025	Palmer, A.; Neuff, A. (1971) Effect of Lindane on Pregnancy of the New Zealand White Rabbit: Report No. 4308/71/464. Unpublished study prepared by Huntingdon Research Centre, Huntingdon, UK. 50 p.
GS0315026	Palmer, A.; Cozens, D.; Lovell, M.; et al. (1972) Effect of Lindane on Reproductive Function of Multiple Generations in the Rat: Final Report: No. 4289/71/445. Unpublished study prepared by Huntingdon Research Centre, Huntingdon, UK. 139 p.
GS0315031	Wilhelm, N.; Pistel, F. (1985) Metabolism of Lindane in Rats and Mice. Unpublished review of published literature with attached reprints. 25 p. attachment.

Appendix II-3

OMB Approval No. 2000-0468 (Expires 12-31-83)

FIFRA SECTION 3(C)(2)(B) SUMMARY SHEET

EPA REGISTRATION NO.

PRODUCT NAME

APPLICANT'S NAME

DATE GUIDANCE DOCUMENT ISSUED

With respect to the requirement to submit "generic" data imposed by the FIFRA section 3(C)(2)(B) notice contained in the referenced Guidance Document, I am responding in the following manner:

☐ 1. I will submit data in a timely manner to satisfy the following requirements. If the test procedures I will use deviate from (or are not specified in) the Registration Guidelines or the Protocols contained in the Reports of Expert Groups to the Chemicals Group, OECD Chemicals Testing Programme, I enclose the protocols that I will use:

Attach separate page(s) with a list of the data requirements your company agrees to satisfy.

☐ 2. I have entered into an agreement with one or more other registrants under FIFRA section 3(C)(2)(B)(ii) to satisfy the following data requirements. The tests, and any required protocols, will be submitted to EPA by:

Attach list of data requirements covered by agreemnet.

NAME OF OTHER REGISTRANT

☐ 3. I enclose a completed "Certification of Attempt to Enter Into an Agreement with Other Registrants for Development of Data" with respect to the following data requirements:

☐ 4. I request that you amend my registration by deleting the following uses (this option is not available to applicants for new products):

☐ 5. I request voluntary cancellation of the registration of this product. (This option is not available to applicants for new products.)

REGISTRANT'S AUTHORIZED REPRESENTATIVE	**SIGNATURE**	**DATE**

EPA Form 8580-1 (10-82)

APPENDIX II-4

OMB Approval No. 2000-0468 (Expires: 12-31-83)

CERTIFICATION OF ATTEMPT TO ENTER INTO AN AGREEMENT WITH OTHER REGISTRANTS FOR DEVELOPMENT OF DATA

(To qualify, certify ALL four items)

1. I am duly authorized to represent the following firm(s) who are subject to the requirements of a Notice under FIFRA Section 3(c)(2)(B) contained in a Guidance Document to submit data concerning the active ingredient:	GUIDANCE DOCUMENT DATE ACTIVE INGREDIENT

NAME OF FIRM	EPA COMPANY NUMBER

(This firm or group of firms is referred to below as "my firm".)

2. My firm is willing to develop and submit the data as required by that Notice, if necessary. However, my firm would prefer to enter into an agreement with one or more other registrants to develop jointly, or to share in the cost of developing, the following required items or data:

3. My firm has offered in writing to enter into such an agreement. Copies of the offers are attached. That offer was irrevocable and included an offer to be bound by an arbitration decision under FIFRA Section 3(c)(2)(B)(iii) if final agreement on all terms could not be reached otherwise. This offer was made to the following firm(s) on the following date(s):

NAME OF FIRM	DATE OF OFFER

However, none of those firm(s) accepted my offer.

4. My firm requests that EPA not suspend the registration(s) of my firm's product(s), if any of the firms named in paragraph (3) above have agreed to submit the data listed in paragraph (2) above in accordance with the Notice. I understand EPA will promptly inform me whether my firm must submit data to avoid suspension of its registration(s) under FIFRA Section 3(c)(2)(B). (This statement does not apply to applicants for new products.) I give EPA permission to disclose this statement upon request.

TYPED NAME	SIGNATURE	DATE

EPA Form 8580-6 (10-82)

FORMULATOR'S EXEMPTION STATEMENT
(40 CFR 152.85)

EPA File Symbol/Reg. No. ______________ Product Name ______________________

Applicant's Name and Address ____

____

____

____

As an authorized representative of the applicant for registration of the product identified above, I hereby certify that:

(1) This product contains the active ingredient(s): _________________

____

____

(2) Each active ingredient listed in paragraph (1) is present solely as the result of the incorporation into the product (during formulation or packaging) of another product which contains that active ingredient, which is registered under FIFRA sec. 3, and which is purchased by us from another producer.

(3) Indicate by circling (A) or (B) below which paragraph applies:

(A) An accurate Confidential Statement of Formula (EPA Form 8570-4) for the above identified product is attached to this statement. That formula statement indicates, by company name, registration number and product name, the source of the active ingredient(s) listed in paragraph (1).

OR

(B) The Confidential Statement of Formula dated __________ on file with the EPA is complete, current and accurate and contains the information required on the current CSF Form No. 8570-4. The registered source(s) of the active ingredient(s) listed in paragraph (1) is/are listed below:

Active ingredient	Source: Product name and Reg. No.

Signature ____________________________

Date ________________ Title ____________________________

EPA Form (April 1985)

Appendix III-1

PRODUCT SPECIFIC DATA REPORT

EPA Registration No. ______________________ Guidance Document for LINDANE

Date ____________________

Registration Guideline Number	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by Citing MRID Number or Accession Number	I am complying with data requirements by Submitting Data (3 Copies attached)	(For EPA Use Only) Accession Numbers Assigned
§158.20 PRODUCT CHEMISTRY					
61-1	Identity of Ingredients				
61-2	Statement of Composition				
61-3	Discussion of Formation of Ingredients				
62-1	Preliminary Analysis				
62-2	Certification of Limits				
62-3	Analytical Methods for Enforcement of Limits				
63-2	Color				
63-3	Physical State				
63-4	Odor				
63-5	Melting Point				
63-6	Boiling Point				
63-7	Density, Bulk-Density, or Specific Gravity				
63-8	Solubility				
63-9	Vapor Pressure				
63-10	Dissociation Constant				
63-11	Octanol/Water Partition Coefficient				
63-12	pH				

EPA Registration No. ____________________ Guidance Document for LINDANE

Registration Guideline Number	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by Citing MRID Number or Accession Number	Submitting Data (3 Copies attached)	(For EPA Use Only) Accession Numbers Assigned
63-13	Stability				
63-14	Oxidizing/Reducing Reaction				
63-15	Flammability				
63-16	Explodability				
63-17	Storage Stability				
63-18	Viscosity				
63-19	Miscibility				
63-20	Corrosion Characteristics				
63-21	Dielectric Breakdown Voltage				
§158.135 TOXICOLOGY					
81-1	Acute Oral Toxicity - Rat				
81-2	Acute Dermal Toxicity				
81-3	Acute inhalation, Toxicity - Rat				
81-4	Primary Eye Irritation, Rabbit				
81-5	Primary Dermal Irritation				
81-6	Dermal Sensitization				

~~cant obtained the data from another firm (identify); applicant copied data from a publication; applicant obtained a copy of the data from EPA).~~

~~(d) The applicant shall submit with his application a statement that EPA, in its evaluation of the properties, efficacy, and safety of the formulated end-use product, may not consider any data as supporting the application, except the following data:~~

~~(1) The data the applicant has submitted to EPA under paragraph (b) of this section;~~

~~(2) Other data pertaining to the safety of the product's active ingredients, rather than to the safety of the end-use product; and~~

~~(3) Existing tolerances, food additive regulations, exemptions, and other clearances issued under the Federal Food, Drug, and Cosmetic Act.~~

~~(e) If the applicant knows that any item of data he submitted under this section was generated by (or at the expense of) another person who originally submitted the data to EPA (or its predecessor, USDA) on or after January 1, 1970, to support an application for registration, experimental use permit, or amendment adding a new use to an existing registration, or for reregistration (unless the applicant and the original data submitter have reached written agreement on the amount and the terms of payment of any compensation that may be payable under FIFRA section 3(c)(1)(D)(ii) with regard to approval of the application), the applicant shall submit to EPA a statement that he has furnished to each such identified original data submitter:~~

~~(1) A notification of the applicant's intent to apply for registration, including the proposed product name;~~

~~(2) An offer to pay the person compensation, with regard to the approval of the application, to the extent required by FIFRA sections 3(c)(1)(D) and 3(c)(2)(D);~~

~~(3) An identification of the item(s) of data to which the offer applies;~~

~~(4) An offer to commence negotiations to ascertain the amount and terms of compensation to be paid; and~~

~~(5) The applicant's name, address and telephone number.~~

~~(f) If the applicant's product contains any active ingredient other than those that are present solely because of the incorporation into the product, during formulation, of one or more other registered pesticide products purchased from another producer, then the applicant shall also comply with § 162.9–5 as to such active ingredient, and the application shall contain an acknowledgment that for purposes of FIFRA section 3(c)(1)(D) the application relies on (and any resulting registration should be regarded as if it were based on the Administrator's consideration of) the following data:~~

~~(1) All data submitted or specifically cited by the applicant in support of the registration; and~~

~~(2) Each other item of data in the Agency's files which:~~

~~(i) Concerns the properties or effects of any such active ingredient; and~~

~~(ii) Is one of the types of data that EPA would require to be submitted for scientific review by EPA if the applicant sought the initial registration under FIFRA Section 3(c)(5) of a product with composition and intended uses identical to those proposed for the applicant's product, under the data requirements in effect on the date EPA approves the applicant's present application.~~

~~(Secs. 3, 6, and 25 of FIFRA, as amended, 7 U.S.C. 136 *et seq.*)~~

~~[44 FR 27953, May 11, 1979]~~

§ 162.10 Labeling requirements.

(a) *General*—(1) *Contents of the label.* Every pesticide products shall bear a label containing the information specified by the Act and the regulations in this Part. The contents of a label must show clearly and prominently the following:

(i) The name, brand, or trademark under which the product is sold as prescribed in paragraph (b) of this section;

(ii) The name and address of the producer, registrant, or person for whom produced as prescribed in paragraph (c) of this section;

(iii) The net contents as prescribed in paragraph (d) of this section;

(iv) The product registration number as prescribed in paragraph (e) of this section;

(v) The producing establishment number as prescribed in paragraph (f) of this section;

(vi) An ingredient statement as prescribed in paragraph (g) of this section;

(vii) Warning or precautionary statements as prescribed in paragraph (h) of this section;

(viii) The directions for use as prescribed in paragraph (i) of this section; and

(ix) The use classification(s) as prescribed in paragraph (j) of this section.

(2) *Prominence and legibility.* (i) All words, statements, graphic representations, designs or other information required on the labeling by the Act or the regulations in this part must be clearly legible to a person with normal vision, and must be placed with such conspicuousness (as compared with other words, statements, designs, or graphic matter on the labeling) and expressed in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use.

(ii) All required label text must:

(A) Be set in 6-point or larger type;

(B) Appear on a clear contrasting background; and

(C) Not be obscured or crowded.

(3) *Language to be used.* All required label or labeling text shall appear in the English language. However, the Agency may require or the applicant may propose additional text in other languages as is considered necessary to protect the public. When additional text in another language is necessary, all labeling requirements will be applied equally to both the English and other-language versions of the labeling.

(4) *Placement of Label*—(i) *General.* The label shall appear on or be securely attached to the immediate container of the pesticide product. For purposes of this Section, and the misbranding provisions of the Act, "securely attached" shall mean that a label can reasonably be expected to remain affixed during the foreseeable conditions and period of use. If the immediate container is enclosed within a wrapper or outside container through which the label cannot be clearly read, the label must also be securely attached to such outside wrapper or container, if it is a part of the package as customarily distributed or sold.

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(ii) *Tank cars and other bulk containers*—(A) *Transportation.* While a pesticide product is in transit, the appropriate provisions of 49 CFR Parts 170-189, concerning the transportation of hazardous materials, and specifically those provisions concerning the labeling, marking and placarding of hazardous materials and the vehicles carrying them, define the basic Federal requirements. In addition, when any registered pesticide product is transported in a tank car, tank truck or other mobile or portable bulk container, a copy of the accepted label must be attached to the shipping papers, and left with the consignee at the time of delivery.

(B) *Storage.* When pesticide products are stored in bulk containers, whether mobile or stationary, which remain in the custody of the user, a copy of the label of labeling, including all appropriate directions for use, shall be securely attached to the container in the immediate vicinity of the discharge control valve.

(5) *False or misleading statements.* Pursuant to section 2(q)(1)(A) of the Act, a pesticide or a device declared subject to the Act pursuant to § 162.15, is misbranded if its labeling is false or misleading in any particular including both pesticidal and non-pesticidal claims. Examples of statements or representations in the labeling which constitute misbranding include:

(i) A false or misleading statement concerning the composition of the product;

(ii) A false or misleading statement concerning the effectiveness of the product as a pesticide or device;

(iii) A false or misleading statement about the value of the product for purposes other than as a pesticide or device;

(iv) A false or misleading comparison with other pesticides or devices;

(v) Any statement directly or indirectly implying that the pesticide or device is recommended or endorsed by any agency of the Federal Government;

(vi) The name of a pesticide which contains two or more principal active ingredients if the name suggests one or more but not all such principal active ingredients even though the names of the other ingredients are stated elsewhere in the labeling;

(vii) A true statement used in such a way as to give a false or misleading impression to the purchaser;

(viii) Label disclaimers which negate or detract from labeling statements required under the Act and these regulations;

(ix) Claims as to the safety of the pesticide or its ingredients, including statements such as "safe," "nonpoisonous," "noninjurious," "harmless" or "nontoxic to humans and pets" with or without such a qualifying phrase as "when used as directed"; and

(x) Non-numerical and/or comparative statements on the safety of the product, including but not limited to:

(A) "Contains all natural ingredients";

(B) "Among the least toxic chemicals known"

(C) "Pollution approved"

(6) *Final printed labeling.* (i) Except as provided in paragraph (a)(6)(ii) of this section, final printed labeling must be submitted and accepted prior to registration. However, final printed labeling need not be submitted until draft label texts have been provisionally accepted by the Agency.

(ii) Clearly legible reproductions or photo reductions will be accepted for unusual labels such as those silk-screened directly onto glass or metal containers or large bag or drum labels. Such reproductions must be of microfilm reproduction quality.

(b) *Name, brand, or trademark.* (1) The name, brand, or trademark under which the pesticide product is sold shall appear on the front panel of the label.

(2) No name, brand, or trademark may appear on the label which:

(i) Is false or misleading, or

(ii) Has not been approved by the Administrator through registration or supplemental registration as an additional name pursuant to § 162.6(b)(4).

(c) Name and address of producer, registrant, or person for whom produced. An unqualified name and address given on the label shall be considered as the name and address of the producer. If the registrant's name appears on the label and the registrant is not the producer, or if the name of the person for whom the pesticide was produced appears on the label, it must be qualified by appropriate wording such as "Packed for * * *," "Distributed by * * *," or "Sold by * * *" to show that the name is not that of the producer.

(d) *Net weight or measure of contents.* (1) The net weight or measure of content shall be exclusive of wrappers or other materials and shall be the average content unless explicitly stated as a minimum quantity.

(2) If the pesticide is a liquid, the net content statement shall be in terms of liquid measure at 68° F (20°C) and shall be expressed in conventional American units of fluid ounces, pints, quarts, and gallons.

(3) If the pesticide is solid or semisolid, viscous or pressurized, or is a mixture of liquid and solid, the net content statement shall be in terms of weight expressed as avoirdupois pounds and ounces.

(4) In all cases, net content shall be stated in terms of the largest suitable units, i.e., "1 pound 10 ounces" rather than "26 ounces."

(5) In addition to the required units specified, net content may be expressed in metric units.

(6) Variation above minimum content or around an average is permissible only to the extent that it represents deviation unavoidable in good manufacturing practice. Variation below a stated minimum is not permitted. In no case shall the average content of the packages in a shipment fall below the stated average content.

(e) *Product registration number.* The registration number assigned to the pesticide product at the time of registration shall appear on the label, preceded by the phrase "EPA Registration No.," or the phrase "EPA Reg. No." The registration number shall be set in type of a size and style similar to other print on that part of the label on which it appears and shall run parallel to it. The registration number and the required identifying phrase shall not appear in such a manner as to suggest or imply recommendation or endorsement of the product by the Agency.

(f) *Producing establishments registration number.* The producing establishment registration number preceded by the phrase "EPA Est.", of the final establishment at which the product was produced may appear in any suitable location on the label or immediate container. It must appear on the wrapper or outside container of the package if the EPA establishment registration number on the immediate container cannot be clearly read through such wrapper or container.

(g) *Ingredient statement*—(1) *General.* The label of each pesticide product must bear a statement which contains the name and percentage by weight of each active ingredient, the total percentage by weight of all inert ingredients; and if the pesticide contains arsenic in any form, a statement of the percentages of total and water-soluble arsenic calculated as elemental arsenic. The active ingredients must be designated by the term "active ingredients" and the inert ingredients by the term "inert ingredients," or the singular forms of these terms when appropriate. Both terms shall be in the same type size, be aligned to the same margin and be equally prominent. The statement "Inert Ingredients, none" is not required for pesticides which contain 100 percent active ingredients. Unless the ingredient statement is a complete analysis of the pesticide, the term "analysis" shall not be used as a heading for the ingredient statement.

(2) *Position of ingredient statement.* (i) The ingredient statement is normally required on the front panel of the label. If there is an outside container or wrapper through which the ingredient statement cannot be clearly read, the ingredient statement must also appear on such outside container or wrapper. If the size or form of the package makes it impracticable to place the ingredient statement on the front panel of the label, permission may be granted for the ingredient statement to appear elsewhere.

(ii) The text of the ingredient statement must run parallel with other text on the panel on which it appears, and must be clearly distinguishable from and must not be placed in the body of other text.

(3) *Names to be used in ingredient statement.* The name used for each ingredient shall be the accepted common name, if there is one, followed by the chemical name. The common name may be used alone only if it is well known. If no common name has been established, the chemical name alone shall be used. In no case will the use of a trademark or proprietary name be permitted unless such name has been accepted as a common name by the Administrator under the authority of Section 25(c)(6).

(4) *Statements of percentages.* The percentages of ingredients shall be stated in terms of weight-to-weight. The sum of percentages of the active and the inert ingredients shall be 100. Percentages shall not be expressed by a range of values such as "22-25%." If the uses of the pesticide product are expressed as weight of active ingredient per unit area, a statement of the weight of active ingredient per unit volume of the pesticide formulation shall also appear in the ingredient statement.

(5) *Accuracy of stated percentages.* The percentages given shall be as precise as possible reflecting good manufacturing practice. If there may be unavoidable variation between manufacturing batches, the value stated for each active ingredient shall be the lowest percentage which may be present.

(6) *Deterioration.* Pesticides which change in chemical composition significantly must meet the following labeling requirements:

(i) In cases where it is determined that a pesticide formulation changes chemical composition significantly, the product must bear the following statement in a prominent position on the label: "Not for sale or use after [date]."

(ii) The product must meet all label claims up to the expiration time indicated on the label.

(7) *Inert ingredients.* The Administrator may require the name of any inert ingredient(s) to be listed in the ingredient statement if he determines that such ingredient(s) may pose a hazard to man or the environment.

(h) *Warnings and precautionary statements.* Required warnings and precautionary statements concerning the general areas of toxicological hazard including hazard to children, environmental hazard, and physical or chemical hazard fall into two groups; those required on the front panel of the labeling and those which may appear elsewhere. Specific requirements concerning content, placement, type size, and prominence are given below.

(1) *Required front panel statements.* With the exception of the child hazard warning statement, the text required on the front panel of the label is determined by the Toxicity Category of the pesticide. The category is assigned on the basis of the highest hazard shown by any of the indicators in the table below:

Hazard indicators	Toxicity categories			
	I	II	III	IV
Oral LD_{50}	Up to and including 50 mg/kg	From 50 thru 500 mg/kg	From 500 thru 5000 mg/kg	Greater than 5000 mg/kg
Inhalation LC_{50}	Up to and including .2 mg/liter	From .2 thru 2 mg/liter	From 2. thru 20 mg/liter	Greater than 20 mg/liter
Dermal LD_{50}	Up to and including 200 mg/kg	From 200 thru 2000	From 2,000 thru 20,000	Greater than 20,000
Eye effects	Corrosive; corneal opacity not reversible within 7 days	Corneal opacity reversible within 7 days; irritation persisting for 7 days.	No corneal opacity; irritation reversible within 7 days	No irritation
Skin effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation at 72 hours

(i) *Human hazard signal word*—(A) *Toxicity Category I.* All pesticide products meeting the criteria of Toxicity Category I shall bear on the front panel the signal word "Danger." In addition if the product was assigned to Toxicity Category I on the basis of its oral, inhalation or dermal toxicity (as distinct from skin and eye local effects) the word "Poison" shall appear in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word "poison."

(B) *Toxicity Category II.* All pesticide products meeting the criteria of Toxicity Category II shall bear on the front panel the signal word "Warning."

(C) *Toxicity Category III.* All pesticide products meeting the criteria of Toxicity Category III shall bear on the front panel the signal word "Caution."

(D) *Toxicity Category IV.* All pesticide products meeting the criteria of Toxicity Category IV shall bear on the front panel the signal word "Caution."

(E) *Use of signal words.* Use of any signal word(s) associated with a higher Toxicity Category is not permitted except when the Agency determines that such labeling is necessary to prevent unreasonable adverse effects on man or the environment. In no case shall more than one human hazard signal word appear on the front panel of a label.

(ii) *Child hazard warning.* Every pesticide product label shall bear on the front panel the statement "keep out of reach of children." Only in cases where the likelihood of contact with children during distribution, marketing, storage or use is demonstrated by the applicant to be extremely remote, or if the nature of the pesticide is such that it is approved for use on infants or small children, may the Administrator waive this requirement.

(iii) *Statement of practical treatment*—(A) *Toxicity Category I.* A statement of practical treatment (first aid or other) shall appear on the front panel of the label of all pesticides falling into Toxicity Category I on the basis of oral, inhalation or dermal toxicity. The Agency may, however, permit reasonable variations in the placement of the statement of practi cal treatment is some reference such as "See statement of practical treatment on back panel" appears on the front panel near the word "Poison" and the skull and crossbones.

(B) *Other toxicity categories.* The statement of practical treatment is not required on the front panel except as described in paragraph (h)(1)(iii)(A) of this section. The applicant may, however, include such a front panel statement at his option. Statements of practical treatment are, however, required elsewhere on the label in accord with paragraph (h)(2) of this section if they do not appear on the front panel.

(iv) *Placement and prominence.* All the require front panel warning statements shall be grouped together on the label, and shall appear with sufficient prominence relative to other front panel text and graphic material to make them unlikely to be overlooked under customary conditions of purchase and use. The following table shows the minimum type size requirements for the front panel warning statements on various sizes of labels:

Size of label front panel in square inches	Points	
	Required signal word, all capitals	"Keep out of reach of Children
5 and under	6	6
Above 5 to 10	10	6
Above 10 to 15	12	8
Above 15 to 30	14	10
Over 30	18	12

(2) *Other required warnings and precautionary statements.* The warnings and precautionary statements as required below shall appear together on the label under the general heading "Precautionary Statements" and under appropriate subheadings of "Hazard to Humans and Domestic Animals," "Environmental Hazard" and "Physical or Chemical Hazard."

(i) *Hazard to humans and domestic animals.* (A) Where a hazard exists to humans or domestic animals, precautionary statements are required indicating the particular hazard, the route(s) of exposure and the precautions to be taken to avoid accident, injury or damage. The precautionary paragraph shall be immediately preceded by the appropriate hazard signal word.

(B) The following table depicts typical precautionary statements. These statements must be modified or expanded to reflect specific hazards.

Toxicity category	Precautionary statements by toxicity category	
	Oral, inhalation, or dermal toxicity	Skin and eye local effects
I	Fatal (poisonous) if swallowed [inhaled or absorbed through skin]. Do not breathe vapor [dust or spray mist]. Do not get in eyes, on skin, or on clothing [Front panel statement of practical treatment required.].	Corrosive, causes eye and skin damage [or skin irritation]. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. [Appropriate first aid statement required.]
II	May be fatal if swallowed [inhaled or absorbed through the skin]. Do not breathe vapors [dust or spray mist]. Do not get in eyes, on skin, or on clothing. [Appropriate first aid statements required.].	Causes eye [and skin] irritation. Do not get in eyes, on skin, or on clothing. Harmful if swallowed. [Appropriate first aid statement required.]
III	Harmful if swallowed [inhaled or absorbed through the skin]. Avoid breathing vapors [dust or spray mist]. Avoid contact with skin [eyes or clothing]. [Appropriate first aid statement required.].	Avoid contact with skin, eyes or clothing. In case of contact immediately flush eyes or skin with plenty of water. Get medical attention if irritation persists.
IV	[No precautionary statements required.]	[No precautionary statements required.]

(ii) *Environmental hazards.* Where a hazard exists to non target organisms excluding humans and domestic animals, precautionary statements are required stating the nature of the hazard and the appropriate precautions to avoid potential accident, injury or damage. Examples of the hazard statements and the circumstances under which they are required follow:

(A) If a pesticide intended for outdoor use contains an active ingredient with a mammalian acute oral LD_{50} of 100 or less, the statement "This Pesticide is Toxic to Wildlife" is required.

(B) If a pesticide intended for outdoor use contains an active ingredient with a fish acute LC_{50} of 1 ppm or less, the statement "This Pesticide is Toxic to Fish" is required.

(C) If a pesticide intended for outdoor use contains an active ingredient with an avian acute oral LD_{50} of 100 mg/kg or less, or a subacute dietary LC_{50} of 500 ppm or less, the statement "This Pesticide is Toxic to Wildlife" is required.

(D) If either accident history or field studies demonstrate that use of the pesticide may result in fatality to birds, fish or mammals, the statement "This pesticide is extremely toxic to wildlife (fish)" is required.

(E) For uses involving foliar application to agricultural crops, forests, or shade trees, or for mosquito abatement treatments, pesticides toxic to pollinating insects must bear appropriate label cautions.

(F) For all outdoor uses other than aquatic applications the label must bear the caution "Keep out of lakes, ponds or streams. Do not contaminate water by cleaning of equipment or disposal of wastes."

(iii) *Physical or chemical hazards.* Warning statements on the flammability or explosive characteristics of the pesticide are required as follows:

Flash point	Required text
(A) PRESSURIZED CONTAINERS	
Flash point at or below 20° F; if there is a flashback at any valve opening	Extremely flammable. Contents under pressure. Keep away from fire, sparks, and heated surfaces. Do not puncture or incinerate container. Exposure to temperatures above 130° F may cause bursting.
Flash point above 20° F and not over 80° F or if the flame extension is more than 18 in long at a distance of 6 in from the flame	Flammable. Contents under pressure. Keep away from heat, sparks, and open flame. Do not puncture or incinerate container. Exposure to temperatures above 130° F may cause bursting.
All other pressurized containers	Contents under pressure. Do not use or store near heat or open flame. Do not puncture or incinerate container. Exposure to temperatures above 130° F may cause bursting.
(B) NONPRESSURIZED CONTAINERS	
At or below 20° F	Extremely flammable. Keep away from fire, sparks, and heated surfaces.
Above 20° F and not over 80° F	Flammable. Keep away from heat and open flame.
Above 80° F and not over 150° F	Do not use or store near heat or open flame.

(I) *Directions for Use*—(1) *General requirements*—(i) *Adequacy and clarity of directions.* Directions for use must be stated in terms which can be easily read and understood by the average person likely to use or to supervise the use of the pesticide. When followed, directions must be adequate to protect the public from fraud and from personal injury and to prevent unreasonable adverse effects on the environment.

(ii) *Placement of directions for use.* Directions may appear on any portion of the label provided that they are conspicuous enough to be easily read by the user of the pesticide product. Directions for use may appear on printed or graphic matter which accompanies the pesticide provided that:

(A) If required by the Agency, such printed or graphic matter is securely attached to each package of the pesticide, or placed within the outside wrapper or bag;

(B) The label bears a reference to the directions for use in accompanying leaflets or circulars, such as "See directions in the enclosed circular:" and

(C) The Administrator determines that it is not necessary for such directions to appear on the label.

(iii) *Exceptions to requirement for direction for use*—(A) Detailed directions for use may be omitted from labeling of pesticides which are intended for use only by manufacturers of products other than pesticide products in their regular manufacturing processes, provided that:

(*1*) The label clearly shows that the product is intended for use only in manufacturing processes and specifies the type(s) of products involved.

(*2*) Adequate information such as technical data sheets or bulletins, is available to the trade specifying the type of product involved and its proper use in manufacturing processes;

(*3*) The product will not come into the hands of the general public except after incorporation into finished products; and

(*4*) The Administrator determines that such directions are not necessary to prevent unreasonable adverse effects on man or the environment.

(B) Detailed directions for use may be omitted from the labeling of pesticide products for which sale is limited to physicians, veterinarians, or druggists, provided that:

(*1*) The label clearly states that the product is for use only by physicians or veterinarians;

(*2*) The Administrator determines that such directions are not necessary to prevent unreasonable adverse effects on man or the environment; and

(*3*) The product is also a drug and regulated under the provisions of the Federal Food, Drug and Cosmetic Act.

(C) Detailed directions for use may be omitted from the labeling of pesticide products which are intended for use only by formulators in preparing pesticides for sale to the public, provided that:

(*1*) There is information readily available to the formulators on the composition, toxicity, methods of use, applicable restrictions or limitations, and effectiveness of the product for pesticide purposes;

(*2*) The label clearly states that the product is intended for use only in manufacturing, formulating, mixing, or repacking for use as a pesticide and specifies the type(s) of pesticide products involved;

(*3*) The product as finally manufactured, formulated, mixed, or repackaged is registered; and

(*4*) The Administrator determines that such directions are not necessary to prevent unreasonable adverse effects on man or the environment.

(2) *Contents of Directions for Use.* The directions for use shall include the following, under the headings "Directions for Use":

(i) The statement of use classification as prescribed in 162.10(j) immediately under the heading "Directions for Use."

(ii) Immediately below the statement of use classification, the statement "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."

(iii) The site(s) of application, as for example the crops, animals, areas, or objects to be treated.

(iv) The target pest(s) associated with each site.

(v) The dosage rate associated with each site and pest.

(vi) The method of application, including instructions for dilution, if required, and type(s) of application apparatus or equipment required.

(vii) The frequency and timing of applications necessary to obtain effective results without causing unreasonable adverse effects on the environment.

(viii) Specific limitations on reentry to areas where the pesticide has been applied, meeting the requirements concerning reentry provided by 40 CFR Part 170.

(ix) Specific directions concerning the storage and disposal of the pesticide and its container, meeting the requirements of 40 CFR Part 165. These instructions shall be grouped and appear under the heading "Storage and Disposal." This heading must be set in type of the same minimum sizes as required for the child hazard warning (See Table in § 162.10(h)(1)(iv).)

(x) Any limitations or restrictions on use required to prevent unreasonable adverse effects, such as:

(A) Required intervals between application and harvest of food or feed crops.

(B) Rotational crop restrictions.

(C) Warnings as required against use on certain crops, animals, objects, or in or adjacent to certain areas.

(D) [Reserved]

(E) For restricted use pesticides, a statement that the pesticide may be applied under the direct supervision of a certified applicator who is not physically present at the site of application but nonetheless available to the person applying the pesticide, unless the Agency has determined that the pesticide may only be applied under the direct supervision of a certified applicator who is physically present.

(F) Other pertinent information which the Administrator determines to be necessary for the protection of man and the environment.

(j) *Statement of Use Classification.* By October 22, 1976, all pesticide products must bear on their labels a statement of use classification as described in paragraphs (j)(1) and (2) of this section. Any pesticide product for which some uses are classified for general use and others for restricted use shall be separately labeled according to the labeling standards set forth in this subsection, and shall be marketed as separate products with different registration numbers, one bearing directions only for general use(s) and the other bearing directions for restricted use(s) except that, if a product has both restricted use(s) and general use(s), both of these uses may appear on a product labeled for restricted use. Such products shall be subject to the provisions of § 162.10(j)(2).

(1) *General Use Classification.* Pesticide products bearing directions for use(s) classified general shall be labeled with the exact words "General Classification" immediately below the heading "Directions for Use." And reference to the general classification that suggests or implies that the general utility of the pesticide extends beyond those purposes and uses contained in the Directions for Use will be considered a false or misleading statement under the statutory definitions of misbranding.

(2) *Restricted Use Classification.* Pesticide products bearing direction for use(s) classified restricted shall bear statements of restricted use classification on the front panel as described below:

(i) *Front panel statement of restricted use classification.* (A) At the top of the front panel of the label, set in type of the same minimum sizes as required for human hazard signal words (see table in § 162.10(h)(1)(iv)), and appearing with sufficient prominence relative to other text and graphic material on the front panel to make it unlikely to be overlooked under customary conditions of purchase and use, the statement "Restricted Use Pesticide" shall appear.

(B) Directly below this statement on the front panel, a summary statement of the terms of restriction imposed as a precondition to registration shall appear. If use is restricted to certified applicators, the following statement is required: "For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification." If, however, other regulatory restrictions are imposed, the Administrator will define the appropriate wording for the terms of restriction by regulation.

(k) Advertising. [Reserved]

[40 FR 28268, July 3, 1975; 40 FR 32329, Aug. 1, 1975; 40 FR 36571, Aug. 21, 1975, as amended at 43 FR 5786, Feb. 9, 1978]

~~§ 162.11 Criteria for determinations of unreasonable adverse effects.~~

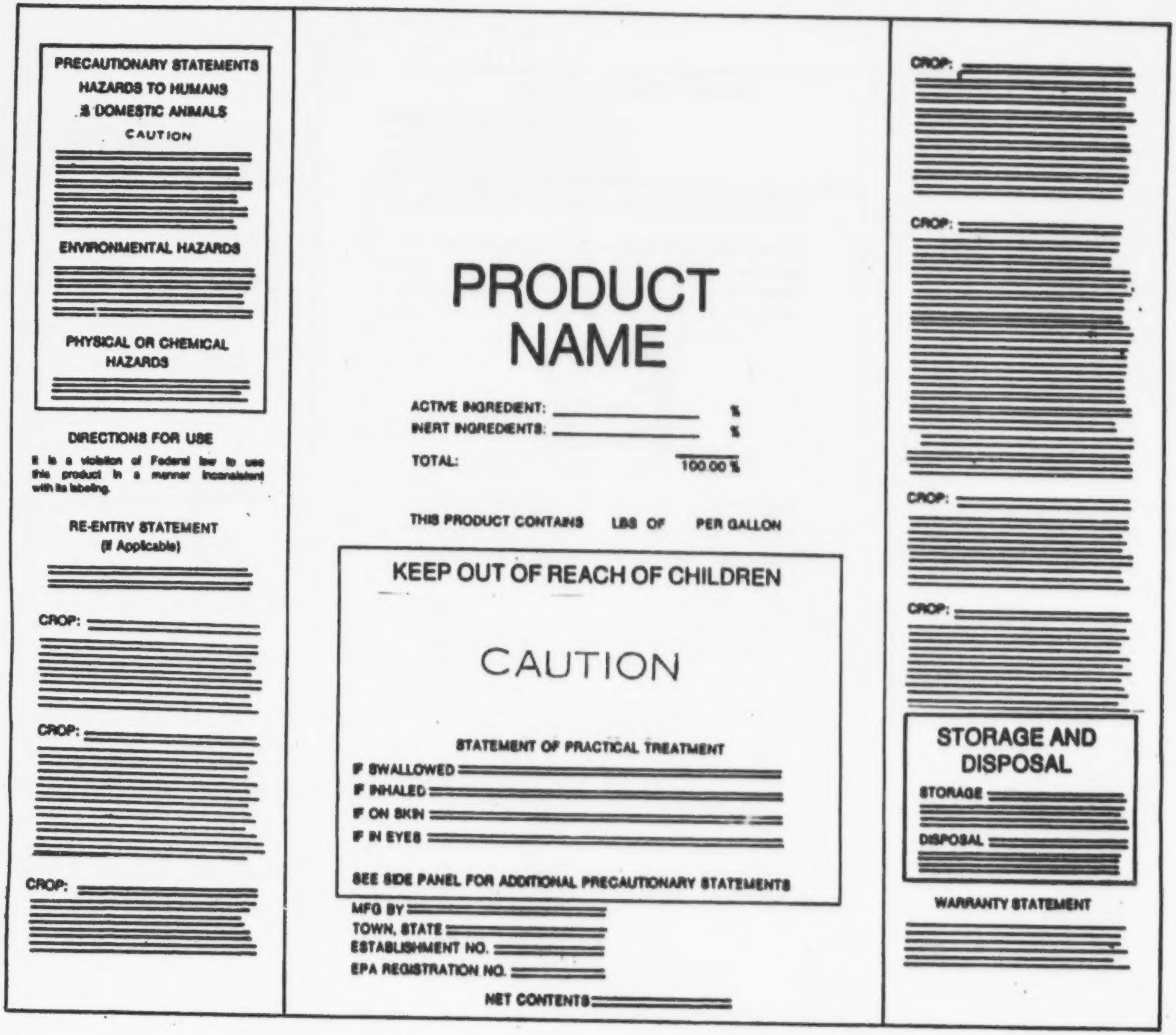
~~(a) *Criteria for Issuance of Notice of Intent to Deny Registration, Cancel Registration, or to Hold a Hearing* — (1) *Presumption.* (i) A rebuttable presumption shall arise that a notice of intent to deny registration pursuant to section 3(c)(6) of the Act, a notice of intent to cancel registration pursuant to section 6(b)(1) of the Act, or a notice of intent to hold a hearing to determine whether the registration should be cancelled or denied, as appropriate, shall be issued, upon a determination by the Administrator that the pesticide meets or exceeds any of the criteria for risk set forth in paragraph (a)(3) of this section. Upon such determination, the Administrator shall issue notice by certified mail to the applicant or registrant, as the case may be, stating that the applicant or registrant has the opportunity to submit evidence in rebuttal of such presumption in accordance with paragraph (a)(4) of this section. The applicant or registrant shall have forty five (45) days from the date such notice is sent to submit evidence in rebuttal of the presumption; provided, however, that for good cause shown the Administrator may grant an additional sixty~~

LABELING REQUIREMENTS OF THE FIFRA, AS AMENDED

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
1	Product name	All products	Front panel	Center front panel	
2	Company name and address	All products	None	Bottom front panel or end of label text	If registrant is not the producer, must be qualified by "Packed for . . .," "Distributed by. . .," etc.
3	Net contents	All products	None	Bottom front panel or end of label text	May be in metric units in addition to U.S. units
4	EPA Reg. No.	All products	None	Front panel	Must be in similar type size and run parallel to other type.
5	EPA Est. No.	All products	None	Front panel, immediately before or following Reg. No.	May appear on the container instead of the label.
6A	Ingredients statement	All products	Front panel	Immediately following product name	Text must run parallel with other text on the panel.
6B	Pounds/gallon statement	Liquid products where dosage given as lbs. ai/unit area	Front panel	Directly below the main ingredients statement	
7	Front panel precautionary statements	All products	Front panel		All front panel precautionary statements must be grouped together, preferably blocked.
7A	Keep Out of Reach of Children (Child hazard warning)	All products	Front panel	Above signal word	Note type size requirements.
7B	Signal word	All products	Front panel	Immediately below child hazard warning	Note type size requirements.

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
7C	Skull & crossbones and word POISON (in red)	All products which are Category I based on oral, dermal, or inhalation toxicity	Front panel	Both in close proximity to signal word	
7D	Statement of practical treatment	All products in Categories I, II, and III	Category I: Front panel unless referral statement is used. Others: Grouped with side panel precautionary statements.	Front panel for all.	
7E	Referral statement	All products where precautionary labeling appears on other than front panel.	Front panel		
8	Side/back panel precautionary statements	All products	None	Top or side of back panel preceding directions for use	Must be grouped under the headings in 8A, 8B, and 8C; preferably blocked.
8A	Hazards to humans and domestic animals	All products in Categories I, II, and III	None	Same as above	Must be preceded by appropriate signal word.
8B	Environmental hazards	All products	None	Same as above	Environmental hazards include bee caution where applicable.

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
8C	Physical or chemical hazards	All pressurized products, others with flash points under 150°F	None	Same as above	
9A	Restricted block	All restricted products	Top center of front panel	Preferably blocked	Includes a statement of the terms of restriction. The words "RESTRICTED USE PESTICIDE" must be same type size as signal word.
9B	Misuse statement	All products	Immediately following heading of Directions for Use		"It is a violation of Federal law to use this product in a manner inconsistent its labeling."
10A	Re-entry statement	See PR Notices 83-2 and 84-1	In the directions for use	Immediately after misuse statement	
10B	Storage and disposal block	All products	In the directions for use	Immediately before specific directions for use or at the end of the directions for use	Must be set apart and clearly distinguishable from from other directions for use.
10C	Directions for use	All products	None	None	May be in metric as well as U.S. units



PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS
& DOMESTIC ANIMALS
CAUTION

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT
(If Applicable)

CROP:

CROP:

CROP:

PRODUCT NAME

ACTIVE INGREDIENT: ______ %
INERT INGREDIENTS: ______ %
TOTAL: 100.00 %

THIS PRODUCT CONTAINS LBS OF PER GALLON

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT
IF SWALLOWED
IF INHALED
IF ON SKIN
IF IN EYES

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY
TOWN, STATE
ESTABLISHMENT NO.
EPA REGISTRATION NO.

NET CONTENTS

CROP:

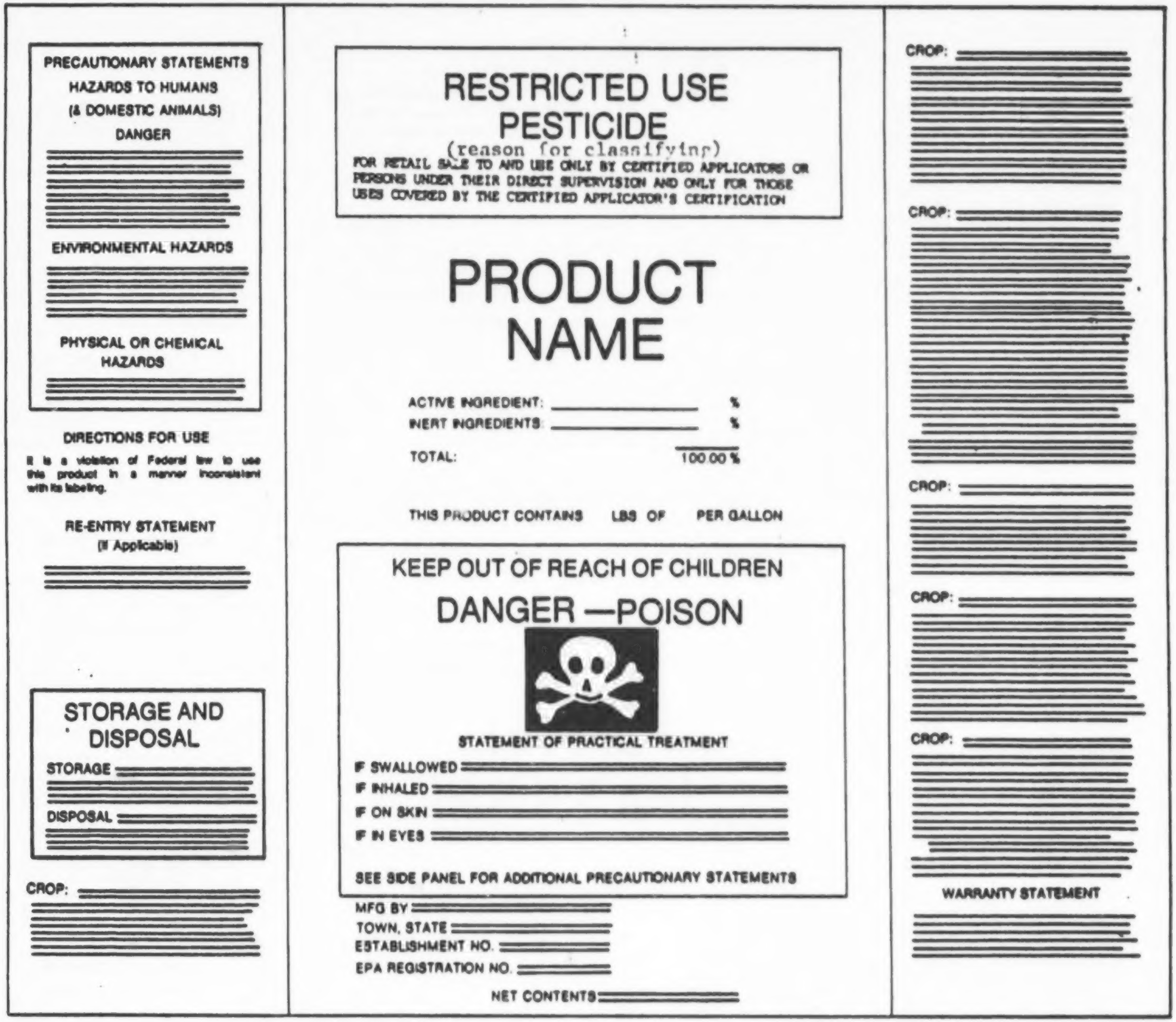
CROP:

CROP:

CROP:

STORAGE AND DISPOSAL
STORAGE
DISPOSAL

WARRANTY STATEMENT



PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS
(& DOMESTIC ANIMALS)
DANGER

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT
(If Applicable)

STORAGE AND DISPOSAL

STORAGE

DISPOSAL

CROP:

RESTRICTED USE PESTICIDE
(reason for classifying)

FOR RETAIL SALE TO AND USE ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION AND ONLY FOR THOSE USES COVERED BY THE CERTIFIED APPLICATOR'S CERTIFICATION

PRODUCT NAME

ACTIVE INGREDIENT: ______ %
INERT INGREDIENTS: ______ %
TOTAL: 100.00 %

THIS PRODUCT CONTAINS LBS OF PER GALLON

KEEP OUT OF REACH OF CHILDREN

DANGER —POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED
IF INHALED
IF ON SKIN
IF IN EYES

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY
TOWN, STATE
ESTABLISHMENT NO.
EPA REGISTRATION NO.

NET CONTENTS

CROP:

CROP:

CROP:

CROP:

CROP:

WARRANTY STATEMENT

Appendix IV-3

PHYSICAL-CHEMICAL HAZARDS

Criteria	Required Label Statement
I. Pressurized Containers	
A. Flashpoint at or below 20°F; or if there is a flashback at any valve opening.	Extremely flammable. Contents under pressure. Keep away from fire, sparks, and heated surfaces. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
B. Flashpoint above 20°F and not over 80°F; or if the flame extension is more than 18 inches long at a distance of 6 inches from the valve opening.	Flammable. Contents under pressure. Keep away from heat, sparks, and flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
C. ALL OTHER PRESSURIZED CONTAINERS	Contents under pressure. Do not use or store near heat or open flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
II. Non-Pressurized Containers	
A. Flashpoint at or below 20°F.	Extremely flammable. Keep away from fire, sparks, and heated surfaces.
B. Flashpoint above 20°F and not over 80°F.	Flammable. Keep away from heat and open flame.
C. Flashpoint over 80°F and not over 150°F.	Do not use or store near heat and open flame.
D. Flashpoint above 150°F.	[None required]

STORAGE AND DISPOSAL INSTRUCTIONS FOR PESTICIDES

All products are required to bear specific label instructions about storage and disposal. Storage and disposal instructions must be grouped together in the directions for use portion of the label under the heading STORAGE AND DISPOSAL. Products intended solely for domestic use need not include the heading "STORAGE AND DISPOSAL." The STORAGE AND DISPOSAL heading must appear in the minimum type size listed below:

Size of label front panel in square inches	Required type size for the heading STORAGE AND DISPOSAL (all capitals)
10 and under	6 point
Above 10 to 15	8 point
Above 15 to 30	10 point
Over 30	12 point

Storage and disposal instructions must be set apart and clearly distinguishable from other directions for use. Blocking storage and disposal statements with a solid line is suggested as a means of increasing their prominence.

A. Storage Instructions:

All product labels are required to have appropriate storage instructions. Specific storage instructions are not prescribed. Each registrant must develop his own storage instructions, considering, when applicable, the following factors:

1. Conditions of storage that might alter the composition or usefulness of the pesticide. Examples could be temperature extremes, excessive moisture or humidity, heat, sunlight, friction, or contaminating substances or media.

2. Physical requirements of storage which might adversely affect the container of the product and its ability to continue to function properly. Requirements might include positioning of the container in storage, storage or damage due to stacking, penetration of moisture, and ability to withstand shock or friction.

3. Specifications for handling the pesticide container, including movement of container within the storage area, proper opening and closing procedures (particularly for opened containers), and measures to minimize exposure while opening or closing container.

4. Instructions on what to do if the container is damaged in any way, or if the pesticide is leaking or has been spilled, and precautions to minimize exposure if damage occurs.

5. General precautions concerning locked storage, storage in original container only, and separation of pesticides during storage to prevent cross-contamination of other pesticides, fertilizer, food, and feed.

6. General storage instructions for household products should emphasize storage in original container and placement in locked storage areas.

B. Pesticide Disposal Instructions:

The label of all products, except those intended solely for domestic use, must bear explicit instructions about pesticide disposal. The statements listed below contain the exact wording that must appear on the label of these products:

1. The labels of all products, except domestic use, must contain the statement, "Do not contaminate water, food, or feed by storage or disposal."

2. Except those products intended solely for domestic use, the labels of all products that contain active ingredients appearing on the "Acutely Hazardous" Commercial Pesticide Products List (RCRA "E" List) at the end of this appendix or are assigned to Toxicity Category I on the basis of oral or dermal toxicity, skin or eye irritation potential, or Toxicity Category I or II on the basis of acute inhalation toxicity must bear the following pesticide disposal statement:

   "Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance."

   The labels of all products, except those intended for domestic use, containing active or inert ingredients that appear on the "Toxic" Commercial Pesticide Products List (RCRA "F" List) at the end of this appendix or presently meet any of the criteria in Subpart C, 40 CFR 261 for a hazardous waste must bear the following pesticide disposal statement:

"Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance."

Labels for all other products, except those intended for domestic use, must bear the following pesticide disposal statement:

"Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility."

3. Products intended for domestic use only must bear the following disposal statement: "Securely wrap original container in several layers of newspaper and discard in trash."

C. Container Disposal Instructions

The label of each product must bear container disposal instructions appropriate to the type of container.

1. All products intended for domestic use must bear one of the following container disposal statements:

Container Type	Statement
Non-aerosol products (bottles, cans, jars)	Do not reuse container (bottle, can, jar). Rinse thoroughly before discarding in trash.
Non-aerosol products (bags)	Do not reuse bag. Discard bag in trash.
Aerosol products	Replace cap and discard containers in trash. Do not incinerate or puncture.

2. The labels for all other products must bear container disposal instructions, based on container type, listed below:

Container Type	Statement
Metal containers (non-aerosol)	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.
Plastic containers	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
Glass containers	Triple rinse (or equivalent). Then dispose of in a sanitary landfill or by other approved state and local procedures.
Fiber drums with liners	Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by state and local authorities. If drum is contaminated and cannot be reused[1], dispose of in the same manner.
Paper and plastic bags	Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.
Compressed gas cylinders	Return empty cylinder for reuse (or similar wording)

1/ Manufacturer may replace this phrase with one indicating whether and how fiber drum may be reused.

Pesticides that are hazardous wastes under 40 CFR 261.33(e) and (f) when discarded.

"Acutely Hazardous" Commercial Pesticides (RCRA "E" List) Active Ingredients, (no inerts):

Acrolein
Aldicarb
Aldrin
Allyl alcohol
Aluminum phosphide
4-Aminopyridine
Arsenic acid
Arsenic pentoxide
Arsenic trioxide
Calcium cyanide
Carbon disulfide
p-Chloroaniline
Cyanides (soluble cyanide salts, not specified elsewere)
Cyanogen chloride
2-Cyclohexyl-4,6-dinitrophenol
Dieldrin
0,0-Diethyl S-[2-ethylthio)ethyl] phosphorodithioate
    (disulfoton, Di-Syston)
0,0-Diethyl 0-pyrazinyl phosphorothioate (Zinophos)
Dimethoate
0,0-Dimethyl 0-p-nitrophenyl phosphorothioate (methyl parathion)
4,6-Dinitro-o-cresol and salts
4,6-Dinitro-o-cyclohexylphenol
2,4 Dinitrophenol
Dinoseb
Endosulfan
Endothall
Endrin
Famphur
Fluoroacetamide
Heptachlor
Hexanethyl tetraphosphate
Hydrocyanic acid
Hydrogen cyanide
Methomyl
alpha-Naphthylthiourea (ANTU)
Nicotine and salts
Octamethylpyrophosphoramide (OMPA, schradan)
Parathion

"Acutely Hazardous" Commercial Pesticides (RCRA "E" List) Active Ingredients continued:

Phenylmercuric acetate (PMA)
Phorate
Potassium cyanide
Propargyl alcohol
Sodium azide
Sodium cyanide
Sodium fluoroacetate
Strychnine and salts
0,0,0,0-Tetraethyl dithiopyrophosphate (sulfotepp)
Tetraethyl pyrophosphate
Thallium sulfate
Thiofanox
Toxaphene
Warfarin
Zinc phosphide

"Toxic" Commercial Pesticide Products (RCRA "F" List) Active Ingredients:

Acetone
Acrylonitrile
Amitrole
Benzene
Bis(2-ethylhexyl)pthalate
Cacodylic acid
Carbon tetrachloride
Chloral (hydrate)
Chlordane (technical)
Chlorobenzene
4-Chloro-m-cresol
Chloroform
o-Chlorophenol
4-Chloro-o-toluidine hydrochloride
Creosote
Cresylic acid
Cyclohexane
Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one
    (kepone, chlordecone)
1,2-Dibromo-3-chloropropane (DBCP)
Dibutyl phthalate
S-3,3-(Dichloroallyl diisopropylthiocarbamate (diallate, Avadex)
o-Dichlorobenzene
p-Dichlorobenzene
Dichlorodifluoromethane (Freon 12®)
3,5-Dichloro-N-(1,1-dimethyl-2-propynyl) benzamide (pronamide,Kerb)
Dichloro diphenyl dichloroethane (DDD)
Dichloro diphenyl trichloroethane (DDT)
Dichlorethyl ether
2,4-Dichlorophenoxyacetic, esters and salts (2,4-D)
1,2-Dichloropropane
1,3-Dichloropropane (Telone)
Dimethyl phthalate
Ethyl acetate
Ethyl 4,4'-dichlorobenzilate (chlorobenzilate)
Ethylene dibromide (EDB)
Ethylene dichloride
Ethylene oxide
Formaldehyde
Furfural
Hexachlorobenzene
Hexachlorocyclopentadiene
Hexachloroethane
Hydrofluoric acid

"Toxic" Commercial Pesticide Products (RCRA "F" List)
Active Ingredients:

Isobutyl alcohol
Lead acetate
Lindane
Maleic hydrazide
Mercury
Methyl alcohol
Methyl bromide
Methyl chloride
2,2'-Methylenebis (3,4,6-trichlorophenol) (hexachlorophene)
Methylene chloride
Methyl ethyl ketone
4-Methyl-2-pentanone (methyl isobutyl ketone)
Naphthalene
Nitrobenzene
p-Nitrophenol
Pentachloroethane
Pentachloronitrobenzene (PCNB)
Pentaclorophenol
Phenol
Phosphorodithioic acid, 0,0-diethyl, methyl ester
Propylene dichloride
Pyridine
Resorcinol
Safrole
Selenium disulfide
Silvex
1,2,4,5-Tetrachlorobenzene
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
2,3,4,6-Tetrachlorophenol
Thiram
Toluene
1,1,1-Trichloroethane
Trichloroethylene
Trichloromonofluoromethane (Freon 11®)
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)
Xylene

Appendix IV-4
(continued)

"Toxic" Commercial Pesticide Products (RCRA "F" List)
Inert Ingredients:

Acetone
Acetonitrile
Acetophenone
Acrylic acid
Aniline
Benzene
Chlorobenzene
Chloroform
Cyclohexane
Cyclohexanone
Dichlorodifluoromethane (Freon 12®)
Diethyl phthalate
Dimethylamine
Dimethyl phthalate
1,4-Dioxane
Ethylene oxide
Formaldehyde
Formic acid
Isobutyl alcohol
Meleic anhydride
Methyl alcohol (methanol)
Methyl ethyl ketone
Methyl methacrylate
Naphthalene
Saccharin and salts
Thiourea
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichlorofluoromethane (Freon 11®)
Vinyl chloride
Xylene

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